ANNUAL REPORT
OF
PROGRAM ACTIVITIES

NATIONAL INSTITUTES OF HEALTH

1967 - 1968

CLINICAL CENTER

Libr ns Unit
Nat of Health
Builc
Bethesda, Maryland 20014

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, U.S NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

OFFICE OF THE DIRECTOR

TABLE OF CONTENTS

Section I

General . . . . OD- 1

Patient Care Statistics
- 1. Admissions . . . . OD- 1
- 2. Normal Volunteers . . . . OD- 2

Key Personnel . . . . OD- 2

Construction: Space Allocations . . . . OD- 3

Medical Board . . . . OD- 3

Panel of Consultants . . . . OD- 3

Clinical and Professional Education Section . . . . OD- 4

Television Engineering Section . . . . OD- 4

Patient Activities Section . . . . OD- 4

Patients' Library . . . . OD- 5

Red Cross Hospital Volunteers . . . . OD- 5

Information Services Section
- Information Office . . . . OD- 5
- Special Events Section . . . . OD- 7
- Preadmissions Unit . . . . OD- 7

Selected Statistics
- Tables:
  - 1. Normal Volunteer Patient Financial Statement OD-11
  - 2. Normal Volunteer Patients by Institute OD-11
  - 3. Normal Volunteer Outpatient Visits OD-12
  - 4. Patient Activities OD-13
  - 5. Red Cross Hospital Volunteers at NIH OD-14
  - 6. Exhibit Schedule OD-15
  - 7. Current Publications OD-16
  - 8. Public Information Activities OD-18
  - 9. Clinical Center Contributions to Professional Literature OD-19
  - 10. Special Events Section Activities OD-25
  - 11. Distribution of Visitors by Continents OD-26

Section II, Highlights of Departmental Annual Reports

- Anesthesiology OD-29
- Blood Bank OD-30
- Clinical Pathology OD-30
- Diagnostic Radiology OD-31
- Employee Health Service OD-32
- Environmental Sanitation Control OD-33
- Nursing OD-34
- Nutrition OD-35

RC
31
U562
1967-68

Nuclear Medicine OD-36
Medical Record OD-37
Pharmacy OD-37
Rehabilitation OD-38
Social Work. OD-39
Spiritual Ministry OD-40

Section III, Clinical Center Department Reports

Anesthesiology Department

General . . . . An- 1
Anesthesiological Procedures . . . . An- 2
Inhalation Therapy Activities . . . . An- 4
Emergency Call Activities . . . . An- 5
Research Activities . . . . An- 5
Major Problems Encountered . . . . An- 7
Changes and Improvements . . . . An- 7
Future Objectives . . . . An- 8
Publications . . . . An- 8

Individual Project Reports

The Human Neuromuscular Refractory Period . . . . An- 9
The Effect of Methoxyflurane Anesthesia on the Ability of the Kidney to Concentrate Urine An-13

Blood Bank Department

Summary of Service and Developmental Accomplishments . . . . BB- 1
Better Blood Utilization . . . . BB- 1
Work Effort . . . . BB- 2
Contributions to Collaborative Research . . . . BB- 2
Mechanism of Acute Renal Failure . . . . BB- 2
Accuracy of Laboratory Examinations . . . . BB- 2
Blood Groups and Disease . . . . BB- 3
Problems, Changes and Improvements . . . . BB- 3
Plant Alterations . . . . BB- 3
Automated Blood Separation . . . . BB- 3
Hepatitis Surveillance . . . . BB- 3
Training . . . . BB- 4
Medical Technologists . . . . BB- 4
Clinical Associates . . . . BB- 4
Professional Staff . . . . BB- 4
Future Plans . . . . BB- 5
Publications . . . . BB- 6

Tables:

1. Blood and Blood Components . . . . BB- 7
2. Work Units . . . . BB- 8

Clinical Pathology Department

Summary . . . . CP- 1
Objectives . . . . CP- 2
Achievements . . . . CP- 3
Clinical Chemistry Service . . . . CP- 3
Hematology Service . . . . CP- 8
Infections Laboratory Services CP-11
Research, Development and Laboratory Automation Section . CP-17

Staffing
  Chemistry . . . . CP- 6
  Hematology CP-11
  Infections Laboratory Services CP-16
  Research, Development and Laboratory Automation Section . . CP-20
  Office of the Chief CP-22
    Appointments, Resignations and Transfers CP-22
    Awards and Honors CP-22
Proposed Course and Future Plans CP-23
Publications CP-26
Tables:
  1. Average Monthly Work Load Statistics for the CPD, FY 1968 . . . . CP-30
  2. List of Formal Training Courses Completed by Staff, FY 1968 . . . . CP-31

Clinical and Professional Education Section
  General . . . . Ed- 1
  The Residency Programs . . . . Ed- 1
  The CORD Program . . . . Ed- 2
  NIH Associate Matching Program . . . . Ed- 2
  Tables:
    1. Statistics on the Matching Program . . . . Ed- 3
    2. Tabulation of Medical Schools, Applicants, and Appointees . . . . Ed- 4
    3. Tabulation of Hospitals Providing Internship Training for Current Candidates and Appointees . . . . Ed- 7
  Appendix:
    1. Schedule for Clinical, Research, and Staff Associate Matching Program for CY 1968 . . . . Ed-11

Department of Diagnostic Radiology
  Accomplishments . . . . DR- 1
  Contributions to Research Programs . . . . DR- 3
  Major Problems Encountered . . . . DR- 6
  Changes and Improvements Made . . . . DR- 8
  Proposed Future Objectives . . . . DR- 9
  Honors and Awards DR-10
  Publications DR-10
  Tables:
    1. Number of X-ray Examinations, FY 1968 . . . . DR-13
    2. Comparison of Activity, FY 1967 and 1968 . . . . DR-14

Employee Health Service Branch
  Occupational Medicine at the Crossroads . . . . EH- 1
  Treatment of On-the-Job Illnesses and Conditions Requiring Emergency Attention . . . . EH- 2
  Pre-employment and Other Examinations . . . . EH- 3
  Referral of Employees to Private Physicians and Dentists . . . EH- 5
  Preventive Medicine Programs . . . . EH- 5
  Administration Considerations . . . . EH- 8
  Publications . . . . EH- 9
  Tables:
    1. Selected Statistics EH-10

Environmental Sanitation Control Department

- Program Goals . . . . ES- 1
- Progress Achieved . . . . ES- 1
  - Administration . . . . ES- 1
  - Environmental Studies . . . . ES- 2
  - Production Improvements . . . . ES- 4
  - Quality Control . . . . ES- 5
  - Training Provided Department Staff . . . . ES- 6
  - Training Provided Non-Departmental Personnel . . . . . ES- 7
  - Miscellaneous . . . . ES- 7
- Problems . . . . ES- 8
  - Hazards and Production Slow-Down . . . . ES- 8
  - Personnel Problems . . . . ES- 8
  - Space . . . . ES- 9
- Plans for Fiscal Year 1969 . . . . ES- 9
  - Administration . . . . ES- 9
  - Technical Services and Environmental Studies . . . . . ES- 9
  - Production Improvement ES-10
  - Training ES-10
  - Systems Analysis Program ES-10
  - Publications ES-10
  - Presentations ES-11
  - Charts:
    - 1. Positions Filled by the Month ES-12
    - 2. Reasons for Personnel Leaving ES-13
    - 3. Number of Separations ES-14
    - 4. Value of Supplies Issued by the Month ES-15
    - 5. Expenditures by Fiscal Year (Supplies) ES-16
  - Table:
    - 1. Formal Training--Classroom ES-17

Medical Record Department

- Objectives . . . . MR- 1
- Major Progress . . . . MR- 1
  - Education and Training . . . . MR- 1
  - Personnel . . . . MR- 1
- Departmental Activities . . . . MR- 1
- Major Problems . . . . MR- 2
  - Coding and Indexing . . . . MR- 2
  - Locating Medical Records . . . . MR- 2
- Proposed Future Objectives . . . . MR- 2
- Table:
  - 1. Patient Statistics, FY 1968 . . . . MR- 4

Department of Nuclear Medicine

- General . . . . NM- 1
- Personnel . . . . NM- 1
- Radiation Safety Section . . . . NM- 2
- Isotope Procurement . . . . NM- 2
- Waste Disposal . . . . NM- 2
- Radioisotope Assays . . . . NM- 2
- Laboratory Surveys . . . . NM- 3
- Personnel Monitoring . . . . NM- 3

Machine and Sealed Source Inspections . . . . NM- 3
Training Courses . . . . NM- 4
AEC Inspection and Licensure . . . . NM- 4
Off-Site Use of Radioisotopes . . . . NM- 4
Building 21 Addition . . . . NM- 4
Diagnostic Radioisotope Section . . . . NM- 5
Whole Body Counter Section . . . . NM- 6
Problem Areas and Future Plans . . . . NM- 7
Publications . . . . NM- 9
Tables:
1. Clinical Diagnostic Procedures NM-11
2. Whole Body Counter Statistics NM-12

Nursing Department

Program Goals . . . . Nr- 1
Progress Made . . . . Nr- 1
Development and Trends . . . . Nr- 4
Major Problems . . . . Nr- 5
Accomplishments . . . . Nr- 6
Publications . . . . Nr- 7
Tables:
1. Hours of Continuous Nursing Care Provided by Each Nursing Service, May 1, 1967, to April 30, 1968 . . . Nr- 8
2. Number of Hours of Nursing Care Given by Part-Time Professional Nurses (WAE) on Each Nursing Service, May 1, 1967, to April 30, 1968 . . . . Nr- 9
3. Number of Hours of Nursing Care Given by Part-Time Professional Nurses (WAE) on Each Nursing Service, Fiscal Years 1967 and 1968. (For comparison) Nr-10
4. Number of Hours of Overtime by Service, May 1, 1967, to April 30, 1968 . . . . Nr-11
5. Total Hours of Nursing Care and Average Number of Hours of Nursing Care per Patient per Day Provided by Each Nursing Service, May 1, 1967, to April 30, 1968 . . . . Nr-12
6. Accessions and Separations by Grade, May 1, 1967, to April 30, 1968 . . . . Nr-13
7. Statistics, Operating Room, May 1, 1967, to April 30, 1968 . . . . Nr-14
8. Diagnostic X-ray Procedures, Admissions and Followup Nursing Service, May 1, 1967, to April 30, 1968 . . . Nr-15

Nutrition Department

Contributions to the Clinical Research Programs . . . . Nt- 1
Accomplishments, Changes, and Improvements . . . . Nt- 5
Major Problems Encountered . . . . Nt- 6
Publications . . . . Nt- 8
Awards . . . . Nt- 8

Pharmacy Department

General . . . . Ph- 1
Radiopharmaceutical Service . . . . Ph- 1
Pharmaceutical Development Service . . . . Ph- 3
Pharmacy Service . . . . Ph- 5
Central Sterile Supply Service . . . . Ph- 7

Office of the Chief . . . . Ph- 8
Professional Activities . . . . Ph- 9
Publications Ph-11
Tables:
1. Pharmacy Department Statistical Data Ph-13

Rehabilitation Department

Introduction . . . . Rh- 1
Services Provided by the Rehabilitation Department . . . . Rh- 1
Physical Therapy Service . . . . Rh- 1
Occupational Therapy Service . . . . Rh- 2
Speech Therapy Service . . . . Rh- 2
Office of the Chief . . . . Rh- 3
Program Development and Changes . . . . Rh- 3
Staff Training . . . . Rh- 4
Participation of Personnel in Professional Activities Off the Campus . . . . Rh- 5
Staffing and Personnel Changes . . . . Rh- 6
Space . . . . Rh- 7
Publications . . . . Rh- 7
Tables:
1. Physical Therapy Service: Statistical Report, by Month, FY 1968 . . . . Rh- 8
2. Physical Therapy Service: Number of Different Patients Treated by Months and Institutes, July 1967 Through June 1968 . . . . Rh- 9
3. Physical Therapy Service: Number of New Patient Admissions, By Institute; Comparative Statistics, FY 1964-1968 . . . . Rh-10
4. Physical Therapy Service: Comparative Statistics, FY 1964-1968 . . . . Rh-11
5. Physical Therapy Service: Percentage of Inpatients Treated (Average), Exclusive of NIMH and NIDR, Comparative Statistics, FY 1964-1968 . . . . Rh-12
6. Physical Therapy Service: Consultation Visits, FY 1968 . . . . Rh-13
7. Physical Therapy Service: Number of Patient Evaluations by the Physiatrists, FY 1964-1968 . . . Rh-14
8. Occupational Therapy Service: Number of Different Patients Treated by Months and Institutes, Including Outpatients and SACP, FY 1968 . . . . Rh-15
9. Occupational Therapy Service: Patients Admitted to Occupational Therapy Including Outpatients and SACP, FY 1968 . . . . Rh-16
10. Occupational Therapy Service: Summary Reports by Institutes of Number of Patients Treated, Number of Treatments and Hours, FY 1968 . . . . Rh-17
11. Occupational Therapy Service: Patient Treatments and Treatment Hours by Institutes: Comparative Statistics, FY 1964-1968 . . . . Rh-18
12. Occupational Therapy Service: Percentage of Inpatients Treated, FY 1968 . . . . Rh-19

13. Occupational Therapy Service: Percentage of Inpatients Treated: Comparative Statistics, FY 1964-1968 . . . . . Rh-20

Social Work Department

- Major Trends . . . . . SW- 1
- Social Work Services Rendered . . . . . SW- 2
- Patient Welfare Fund . . . . . SW- 3
- Staffing . . . . . SW- 5
- Staff Development . . . . . SW- 6
- Practice Oriented Studies . . . . . SW- 8
- Problem Areas . . . . . SW- 8
- Future Objectives SW-10

Reports from Department Sections

- Neurological Social Work Section SW-11
- Arthritis and Metabolic Diseases Allergy and Infectious Diseases Social Work Section . . . SW-14
- Cancer Social Work Section SW-18
- Heart Social Work Section SW-20

Individual Project Reports

- The Peer Group Phenomenon in Young Women in Cancer SW-23
- The Effect of Cystic Fibrosis on the Social Functioning of Adolescent and Young Adult Patients SW-25
- Does Surgical Success in Children with Heart Diseases in the Latency and Adolescent Age Groups Result in Significant Positive Changes in Social Functioning SW-26
- Evaluation of Social Functioning of Male Patients Following Replacement of Their Aortic or Mitral Valves SW-28
- Professional Activities SW-29

Tables:

1. Inpatient Coverage by Percentage Served Each Month . . SW-33
2. Number of Clients Served Each Month SW-34
3. Major Concentration of Problems on Each Institute . . . SW-35
4. Summary of Monthly Totals of Patients Served SW-36
5. Group Activity Report SW-37
6. Patient Welfare Fund Expenditures (FY 1968) SW-38
7. Patient Welfare Fund Expenditures (FY 1967) SW-39
8. Patient Welfare Fund Income SW-40

Department of Spiritual Ministry

- Overview . . . . . SM- 1
- Chapel Service . . . . . SM- 2
- Pastoral Ministry to Patients and Their Families . . . . . SM- 3
- Illustrations of Pastoral Ministry . . . . . SM- 4
- Pastoral Training for Clergy . . . . . SM- 5
- Orientation of Staff . . . . . SM- 6
- Monthly Chaplain Seminars . . . . . SM- 6
- Research . . . . . SM- 7
- Professional Meetings (Chaplaincy) . . . . . SM- 7
- Professional Meetings (Ecclesiastical) . . . . . SM- 8
- Lectures . . . . . SM- 9
- Community Contacts . . . . . SM- 9

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

OFFICE OF THE DIRECTOR

CC-01
Serial No.

TABLE OF CONTENTS

Section I

General . . . . OD- 1

Patient Care Statistics

1. Admissions . . . . OD- 1
2. Normal Volunteers . . . . OD- 2

Key Personnel . . . . OD- 2
Construction: Space Allocation . . . . OD- 3
Medical Board . . . . OD- 3
Panel of Consultants . . . . OD- 3
Clinical and Professional Education Section . . . . OD- 4
Television Engineering Section . . . . OD- 4
Patient Activities Section . . . . OD- 4
Patients' Library . . . . OD- 5
Red Cross Hospital Volunteers . . . . OD- 5

Information Services Section

Information Office . . . . OD- 5
Special Events Section . . . . OD- 7
Preadmissions Unit . . . . OD- 7

Selected Statistics

Tables:

1. Normal Volunteer Patient Financial Statement OD-11
2. Normal Volunteer Patients by Institute OD-11
3. Normal Volunteer Outpatient Visits OD-12
4. Patient Activities OD-13
5. Red Cross Hospital Volunteers at NIH OD-14
6. Exhibit Schedule OD-15
7. Current Publications OD-16
8. Public Information Activities OD-18
9. Clinical Center Contributions to Professional Literature OD-19
10. Special Events Section Activities OD-25
11. Distribution of Visitors by Continents OD-26

Section II, Highlights of Departmental Annual Reports

Anesthesiology OD-29
Blood Bank OD-30
Clinical Pathology OD-30
Diagnostic Radiology OD-31
Employee Health Service OD-32
Environmental Sanitation Control OD-33
Nursing OD-34
Nutrition OD-35

Nuclear Medicine OD-36
Medical Record OD-37
Pharmacy OD-37
Rehabilitation OD-38
Social Work OD-39
Spiritual Ministry OD-40

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

OFFICE OF THE DIRECTOR

CC-01
Serial No.

GENERAL

The Clinical Center is the research hospital for the National Institutes of Health. Its mission, in support of the clinical investigation activity of the categorical Institutes, is to provide the optimum in patient care. It makes available facilities for its professional staff to pursue research projects pertaining to improving methods of diagnosis and patient care. Another important objective is to provide the most favorable circumstances for medical progress by combining outstanding services and modern facilities with opportunities for young physicians and other professionals to prepare for careers in medical or related research or in academic medicine. The contiguity of hospital beds and well-equipped laboratories, together with the patient or a single disease entity, makes the Clinical Center an important national resource for the advancement of medicine.

The administration of the Clinical Center plans and directs all services (except physician care) related to patient care activities. In carrying out this responsibility the Office of the Director utilizes the skills of many specialists in these departments: Nursing, Diagnostic Radiology, Nuclear Medicine, Pharmacy, Anesthesiology, Clinical Pathology, Blood Bank, Pathological Anatomy, Social Work, Medical Record, Nutrition, Rehabilitation, Spiritual Ministry, Environmental Sanitation Control, and Employee Health Service.

PATIENT CARE STATISTICS

1. Admissions

The number of patients in FY 1968 was 6,510, slightly below the number during the previous year. Readmitted patients continued to outnumber those admitted for the first time by close to 2 to 1. First registrations totaled 1,378 with readmissions totaling 2,649.

Outpatient registration for first time follow-up observation was slightly less than FY 1967--2,455. There were 4,027 inpatients admitted.

Patients (adult and pediatric) were hospitalized for an average of 33 days with 69 percent of the beds occupied during the average period. Nine "walk-in" and 19 emergency patients were determined acceptable for admission.

Number of discharges (includes 183 deaths)	4,083
Number of deaths	183
Available bed days	188,856
Inpatient days	130,722
Average daily census	357
Total patients admitted to Clinical Center from July 6, 1953, to June 30, 1968	49,821

2. Normal Volunteers

The demand for normal volunteers remained essentially the same in FY 1968 as in FY 1967 with little appreciable change in characteristics required by medical investigators. However, a shortage of normal volunteers in the 21 year or older age-group--males in particular--presented some difficulty.

The number of in-patient volunteers dropped from 356, FY 1967, to 306, FY 1968 The outpatient normal volunteer program continued to grow. Clinic visits increased this year over FY 1967 by 31 percent--from 4,609 to 6,799. Clinic hours rose 37 percent--from 11,439 (FY 1967) to 18,188 in FY 1968. Encouragement of contract amendments by two sponsoring agencies to recruit potential volunteers for all Institutes rather than NIMH only, increased use of normal volunteers by NIMH, and two new studies by NHI and NCI accounted for some of the growth.

The termination of an NIMH study resulted in a significant decrease in the off-site phase of the Normal Volunteer Patient Section. Visits to off-site volunteers dropped from 1,789 (FY 1967) to 898 or approximately 50 percent in FY 1968.

The career development phase of the normal volunteer program continued to create strong positive influences in two areas: (1) the educational values college sponsoring agencies perceive when their students participate in the program, and (2) realization by the normal volunteer student that participation in career development assignments made available to them during free time helps broaden their experience and knowledge. (For statistics on the normal volunteer program, see Tables 1 to 3.)

KEY PERSONNEL

No personnel changes occurred among members of the senior administrative staff of the Clinical Center.

Dr. George Z. Williams, chief of the Clinical Pathology Department, was awarded the honorary Doctor of Science degree from the University of Colorado at Commencement Day ceremonies June 7, 1968. Dr. Williams' important contributions to the scientific development of medicine have been acknowledged internationally

Milton W. Skolaut, chief of the Pharmacy Department, was elected to a 3-year term as Treasurer of the American Society of Hospital Pharmacists at the Society's 1968 Annual Meeting. Mr. Skolaut is a former President of the Society, and he has won wide recognition for his imaginative leadership in the science of pharmacy.

CONSTRUCTION: SPACE ALLOCATION

Construction and remodeling of two floors of the Clinical Center's D-wing progressed according to schedule. The wing was increased to seven floors in height with approximately 14,000 square feet of floor space on the sixth and seventh floor levels. Occupancy by various departments and sections took place the latter part of June 1968. Included were Rehabilitation; Spiritual Ministry; Normal Volunteer Patient Section; Patient Activities Section, including Red Cross Hospital Volunteer Service and Patients' Library; Patients' School.

Remodeling work continued on the 13th floor, north corridor, to restore this area to patient bedrooms for which it was originally designed. Occupants, including some Nutrition and Social Work Department personnel, were moved to the D-wing.

A contract firm took over operation of the CC Cafeteria and began temporary service, under supervision of NIH Executive Office, in a newly constructed section with a seating capacity of 270 persons. Remodeling of the existing cafeteria area was begun. Upon completion the cafeteria will have a seating capacity of 650 persons and will accommodate three serving lines simultaneously.

The NIH Library addition on the west side of the CC auditorium was completed and occupied in June 1968. The space it vacated on the fifth floor, north corridor, of Bldg. 10 was returned to laboratory and office use.

MEDICAL BOARD

The Medical Board for 1967 had a new chairman and two new members. There were a number of changes in appointments to the various committees of the Medical Board.

The Clinical Research Committee was very active again during FY 1968, having recommended 87 projects involving normal volunteers. All of them were approved by the Director, NIH.

PANEL OF CONSULTANTS

During the past fiscal year there were 456 visits by medical care consultants to the Clinical Center. Two medical care consultants were added to the roster, making a total of 164.

The system for calling medical care consultants was satisfactory. Institute staff members responsible for covering a particular specialty were designated as panel chiefs. If a staff member wishes the services of a medical care consultant he makes known his desire to the responsible panel chief who then makes arrangements for securing the services of the consultant desired. In this manner a consultant can be used by more than one Institute during one visit to the Clinical Center. It is felt that the consultant program has worked very well.

CLINICAL AND PROFESSIONAL EDUCATION SECTION

Requests for application materials for Associate training positions numbered 1,231. Six hundred and ninety-two of these applications were returned to NIH for consideration. There were 476 candidates invited to Bethesda for personal interviews. The number selected to participate in the Program--226--was appro imately 19 percent greater than FY 1967. Of these, 113 will serve as Clinical Associates, 37 as Research Associates, 72 as Staff Associates, and 4 as Resear Associates in Pharmacology Training. Most of the newly selected Associates will begin active duty at NIH in 1969. (For additional data, see pp. Ed 1-1

TELEVISION ENGINEERING SECTION

The Television Engineering Section during FY 1968 made significant progress in its value as a collaborative service for improved patient care. Total effort was devoted to the application of television in heart catheterization procedures, diagnostic x-ray, and the Nuclear Medicine Branch's diagnostic techniques. Two new video tape recorders were put into operation enabling complet video tape facilities for biplane procedures from the Heart Catheterization Laboratory. Slow speed and stop frame playback aided observations. With thre video recorders, simultaneous recording of a biplane procedure and an AP from the Heart Catheterization Laboratory was made possible.

Establishment of video tape facilities for the NIMH Section on Twin and Siblin Studies was accomplished. A full-time technician attends the equipment and TV engineers are available as needed.

A wide variety of other applications were employed for the TV Engineering Section's TV equipment in FY 1968. Developmental work on the heart tracking project included video recording of an EKG signal with the image intensifier image. Analysis is accomplished by playback. Additional work was done on the Radioisotope Angiocardiogram Technique.

Installation of a generator to provide constant synchronization pulses to the TV equipment in the CC Diagnostic Radiology Department was accomplished. Section engineers designed a small television system for observation on monkeys. They also designed a small television system to study child activity in a defined situation and monitor the EEG combining the two signals through a generator to be recorded on a video tape recorder.

PATIENT ACTIVITIES SECTION

Clinical Center patients continued to be offered a wide variety of interesting recreational activities. The programs, active and passive, conducted both on and off the NIH reservation, consisted of social events; music, arts, and crafts; adapted sports; and dramatics. Available to adult and child patients of the CC, the programs utilized the various 14th floor recreation facilities of the CC, outdoor reservation areas, and selected community resources. All programs were conducted under the guidance of professional staff recreation therapists.

Emphasis was placed on "bedside" and "special patient" programs. Specially adapted forms of recreation were brought to the patient confined to his room or unit as well as patients having adjustment problems. Adult patient programs numbered 1,087 (882 active, 205 passive). Children's programs totaled 680 (630 active, 50 passive). (See Table 4.)

PATIENTS' LIBRARY

The same experienced staff that has provided CC patients with library services during the past 3 years loaned more than 2,000 books to patients each month during FY 1968. Losses, averaging 14 books per month, may be considered incredibly low. The "Ready to Shelve" book buying method now applies to at least 50 percent of all books purchased, saving staff time and labor.

RED CROSS HOSPITAL VOLUNTEERS

The Red Cross Hospital Volunteer Program concentrated heavily on adjustments in the administrative function. Reassignment of personnel resulted in an overall upgrading of service by placing several volunteers in more mutually acceptable positions.

The Hospital Art Cart Program continued as a smoothly functioning service in which a volunteer is now available each day of the week. This "Pictures for Patients" program permits patients to select paintings for their rooms. The collection of 750 art items grew from 150 when the program was initiated in 1964. A coffee cart program for patients and relatives in the Outpatient Department was begun and is a daily service to that area. (For statistics on the Hospital Volunteer Program, see Table 5.)

Sixteen was set as the minimum age limit for summer Junior Red Cross Hospital Volunteers in a resolution passed at the annual Advisory Board Meeting. The senior staff continued to conduct intensive orientations for these young people.

INFORMATION SERVICES SECTION

Information Office

This office provides public information and public relations services for the Clinical Center. During FY 1968, the Information staff again produced a wide variety of printed and processed materials about the patient care program for general distribution as well as administrative use. Staff members cooperated with newspaper reporters, science writers, TV and movie crews, representatives of voluntary health agencies and others to assure that accurate and complete information was disseminated to acquaint the public with Clinical Center programs and achievements. The staff edited over 100 scientific papers or articles prepared by the CC professional staff for publication in medical and hospital journals, and revised several administrative documents written for staff guidance.

As in past years, much of the Information staff's time was devoted to direct communication with the public--by letter, telephone, or in person. More than 18,000 inquiries from professional and lay people were handled during the year.

Publications distributed to physicians, dentists, scientists, and other interested persons in FY 1968 numbered about 73,000. Press announcements directed to appropriate media totaled 49. (For additional statistics, see Tables 6-11.)

An effective medium in fostering continuing communication and understanding among physicians of the Clinical Center's mission was the distribution of two editions of the booklet "Current Clinical Studies and Patient Referral Procedures." Each edition was sent to over 12,000 physicians who had indicated an interest in receiving a copy, and 9,000 copies were utilized by Institute clinicians.

Publication of the Proceedings of Combined Clinical Staff Conferences in the Annals of Internal Medicine and the distribution of reprints from the journal continued to be another effective method of maintaining NIH liaison with the physician in private practice, research or teaching. The Information office edited 6 of these and distributed about 20,000 reprints in FY 1968 in response to requests from physicians throughout the country and abroad.

As part of the effort to help the Clinical Center Nursing Department share the informative professional presentations given at seven annual clinical nursing conferences on a broader scale, the Information staff edited the proceedings of four such conferences and distributed about 1,000 copies of the first printed monograph in the series. The response from nursing associations, schools, state and federal groups, and individuals was enthusiastic and included many requests to receive future conference proceedings on a regular basis. To further utilize the material and to achieve added public recognition of the nurses who participate in these conferences, the Information staff sent 15 news releases with photographs to each participant's home town newspaper, nursing school, and college alumni magazine. Clippings of items published through these sources indicated the usefulness of this service. The resultant boost in morale of the Nursing Department personnel proved to be a fringe benefit of this publicity.

A new 15-page, illustrated brochure "The Frontier of Clinical Pathology" was prepared by the Information staff as a recruitment device for medical technologists. Review copies of the brochure and announcements of its availability were distributed to AMA-approved schools of medical technology and cytotechnology and to appropriate journals and newsletters in April 1968. By the end of June requests for approximately 2,000 copies had been filled by the Information staff.

As a supplement to "Handbook for Patients at the Clinical Center" which is given to the patient on admission, the Information staff issued "Tips for Your Trip." This leaflet was designed for distribution to accepted patients in advance of their arrival. It provides facts about what to bring, directions on how to get to the Clinical Center by any mode of transportation, and useful miscellaneous information.

Publicity for the NIH blood donor program during the year included 4 posters, 24 articles, and a new descriptive brochure "Your Blood Does Wonderful Things at the Clinical Center," with an attached wallet-size blood insurance identification card for NIH employees.

The Information Officer participated in the various orientation programs of the Clinical Center. These included nursing personnel, social workers, and Red Cross Hospital Volunteers. Five Information Interns were assigned to the Office during the year and they were given a total of 1,200 hours' on-the-job training. In addition, the Information Officer served as Chairman of the NIH Information Intern Committee the first half of FY 1968, completing a 1-year term.

Special Events Section

The Special Events staff served 3,592 visitors to NIH in FY 1968. The ratio of foreign and domestic visitors was 925 to 2,667.

Appointments with NIH staff members decreased from 1,088 to 654. Film showings dropped from 574 to 460, but audiences were proportionately higher, decreasing only slightly from 3,597 (the previous year) to 3,558 in FY 1968. Two hundred and ninety-seven tours were conducted for 1,464 visitors. Distribution of selected publications to visitors totaled 21,722 copies. Over 2,400 public inquiries were answered, compared to 2,300 in FY 1967.

The Section provided staff assistance for 122 meetings, with 20,000 scientific and administrative people attending. Nine Combined Clinical Staff Conferences and seven Medical Grand Rounds were included.

Preadmissions Unit

The Preadmissions Unit processes patient referrals, is the contact point for physician inquiries, and acts as liaison between Members of Congress and NIH on patient care. It is the repository for all medical data pertaining to prospective patients and is responsible for making these data available to NIH physicians at the time of a patient's admission.

During FY 1968 this unit processed 5,964 physician, 3,158 lay, and 658 Congressional inquiries.

SELECTED STATISTICS

Table 1

Normal Volunteer Patient Financial Statement, FY 1968*

Institute	Amount
NIAID	$15,468.31
NIAMD	21,325.33
NCI	14,748.80
NICHD	2,959.47
NIDR	425.00
NHI	17,800.86
NIMH	71,683.41
NINDB	.00
	$144,411.18

Table 2

Normal Volunteer Patients by Institute, FY 1968*

	VOLUNTEERS			DAYS		
Institute	Male	Female	Total	Male	Female	Total
NIAID	18	32	50	1,097	1,313	2,410
NIAMD	30	31	61	1,570	1,685	3,255
NCI	15	39	54	918	2,206	3,124
NICHD	0	0	0	0	0	0
NIDR	0	0	0	0	0	0
NHI	21	41	62	947	1,741	2,688
NIMH	32	47	79	1,172	1,627	2,799
NINDB	0	0	0	0	0	0
	116	190	306	5,704	8,572	14,276

---

*Estimated for April, May, and June.

Table 3

Normal Volunteer Outpatient Visits, FY 1968*

Clinic Visits

Institute	Number	Hours
NIAMD	77	175
NCI	12	46
NHI	864	960
NIMH	5,846	17,007
Totals	6,799	18,188

Away from reservation

Institute	Number	Hours
NIAMD	47	...
NICHD	491	2,201
NIDR	167	...
NIMH	193	933
Totals	898	3,134

---

* Estimated for April, May, and June.

Table 4

Patient Activities

Patients' Library

	FY 1968	FY 1967	FY 1966
Books circulated	24,024	22,800	20,545
Patients visiting the Library	4,966	5,040	4,809

Recreation Programs, FY 1968

Adults

Scheduled active programs	882
Scheduled passive programs	205
Average patient participation per programed activity	32

Children

Scheduled active programs	630
Scheduled passive programs	50
Average patient participation per programed activity	9

Table 5

Red Cross Hospital Volunteers at NIH

Hours of Service, FY 1968*

Captain of the Day		1,777
Chapel		330
Rehabilitation Department		
Occupational Therapy	4,325	
Physical Therapy	677	5,002
Patient Activities		
Patients' Library	1,902	
Recreational Activities	1,168	3,070
Personal Services (Unit Volunteers only)		
Feeding patients	30	
Escorting patients	600	
Visiting patients	3,270	3,900
Personal Services		
Escorting patients (by other than Unit Volunteers)		11
Art Cart		440
Visiting patients (by other than Unit Volunteers)		2,211
Blood Bank		30
Administration		458
Training and orientation		111
Total number of hours		17,340

---

*Estimated for April, May, and June

Table 6

Exhibit Schedule, FY 1968

Title	Date	Meeting	Location
Prevention of Radiation Nephritis with Renal Artery Infusion of Vasoconstrictive Agents	Dec. 1-6	Radiological Society of North America, 53rd annual meeting	Chicago, Ill.
Selective Arteriography of Spinal Cord Arteriovenous Malformation	Oct. 1-4	American Roentgen Ray Society, 68th annual meeting	Washington, D. C.
A Different Approach to Radiographic Positioning	Nov. 11-13	Mid-Eastern Conference for Radiologic Technologists, annual meeting	Washington, D. C.

Table 7

Current Publications, FY 1968

New publications

For Medical Technologists: The Frontier of Clinical Pathology--Recruitment brochure

Nursing Care of Patients with Pheochromocytoma, a Nursing Clinical Conference

Prayers for the Sickroom

Tips for Your Trip

Your Blood Does Wonderful Things at the Clinical Center, including Blood Insurance Identification card--Blood Donor Recruitment booklet

Revised and reprinted publications

Associate Training Programs in the Medical and Biological Sciences at NIH, Catalog 1968, PHS Pub. No. 1294

Current Clinical Studies and Patient Referral Procedures (2 editions)

The Friendly Clinical Center--coloring book

Handbook for Patients at the Clinical Center

Handbook for Staff Physicians, Clinical Center

Surgical Wing of the Clinical Center

Reprints of articles published in periodicals

Combined Clinical Staff Conferences published in the Annals of Internal Medicine were reprinted and distributed to physicians on request:

The Application of Multicompartmental Analysis to Problems of Clinical Medicine

The Biological Properties of Etiocholanolone

Cystinosis

Hodgkin's Disease

The Physiologic Basis for Therapy of Classic Hemophilia (Factor VIII Deficiency) and Related Disorders

Physiologic Basis of Disorders of Androgen Metabolism

Other reprints made available through the Information Office:

Intravenous Additive Service Improves I. C. Preparation. Hospitals.

Law and Medicine--Insurance Coverage for Clinical Investigation. JAMA.

The Nurse: First Line of Defense Against Infections. Hospitals.

Pharmaceutical Development: New Concept in Pharmacy Service. Hospitals.

Quantitative Analysis and Alkaline Stability Studies of Allopurinol. J. Pharm. Sci.

Repackaging Liquids by a Pump System. Hospitals.

Miscellaneous

Posters
- Associate Training Programs in the Medical and Biological Sciences at NIH
- Recruitment of Blood Donors (4)
- Recruitment of Normal Volunteer Patients

Blood Insurance Identification (wallet-size card)

Patient Recruitment Announcements to Referring Physicians and Dentists

Press Announcements

Tent Cards for Blood Donor Day

Table 8

Public Information Activities, FY 1968

Month	Speeches	Announcements	Inquiries Press	 Lay	 Physician	 Congressional	Publications distributed	Reports	Films
1967									
July		2	17	994	567	81	2,009		43
August		3	9	1,259	583	57	6,831		75
September		1	6	1,189	489	39	2,776		49
October		5	8	1,083	468	57	20,368		72
November		10	10	926	746	77	3,304		30
December			5	693	544	46	2,800		37
1968									
January		3	8	1,057	539	71	2,470		38
February		7	6	664	531	71	2,347		30
March		5	7	1,021	360	35	3,531		47
April		6	16	901	331	26	5,736	1	36
May		4	13	808	386	48	17,704		38
June	1	3	7	865	420	58	2,199	16	30
Totals	1	49	112	11,460	5,964	666	72,075	17	525

Table 9

Clinical Center Contributions to Professional Literature, FY 1968

Adamson, J. W.: The erythropoietin/hematocrit relationship in normal and polycythemic man: Implications of marrow regulation. Blood.

Adamson, J. W. and Finch, C. A.: Erythropoietin and the polycythemias. Trans. N. Y. Acad. Sci.

Anderson, L. C. and Himmelsbach, C. K.: The nurse: First line of defense against infections. Hospitals.

Ashburn, W. L., Harbert, J. C., Whitehouse, W. C., Mason, D. T., and Schuette, W. H.: A video system for recording dynamic radioisotope studies with the Anger scintillation camera. J. Nucl. Med.

Bennett, J. M. and Desforges, J. F.: Quinine induced hemolysis: mechanism of action. Brit. J. Haemat.

Bennett, J. M. and Dutcher, T. F.: The cytochemistry of acute leukemia: Observations on glycogen and natural fat in bone marrow aspirates. Blood.

Bennett, J. M., Nathanson, L., and Rutenburg, A.M.: Significance of leucocyte alkaline phosphatase in Hodgkin's disease. Arch. Int. Med.

Bennett, J. M., Rubert, J., and Dixon, S.: A new semiautomated method for the concentration of cerebrospinal fluid for cytologic examination. Amer. J. Clin. Path.

Bennett, J. M., Rubert, J., and Dixon, S.: A new semiautomated method for the concentration of cerebrospinal fluid for cytologic examination. Tech. Bull.

Bennett, J. M., Rutenburg, A. M., Hall, T., and Nathanson, L.: Clinical application of leucocyte alkaline phosphatase in Hodgkin's disease. Clin. Res.

Bennett, J. M., Yu, D., Syemoto, J., and Pechet, L.: The effects of infusing thrombin and its acetylated derivative. II. Observations on intravascular hemolysis with pathologic correlations. Thromb. Diath. Haemorrh.

Blandford, R. R.: Peer group membership of young women with cancer. J. Chronic Dis.

Bourgeois, L. D., Branche, W. C., and Ramey, F. H.: New combination of antibiotics for treatment of contaminated specimens for viral studies. Appl. Microbiol.

Briner, W. H.: The preparation of ^{125}I-labeled microaggregate human serum albumin for use in studies of reticuloendothelial function in man. J. Nucl. Med.

Briner, W. H.: Radiopharmacy--the emerging young specialty. Drug Intelligence.

Briner, W. H., Ashburn, W. L., Di Chiro, G., and Harbert, J.: ^{99m}Tc-Albumin for brain scanning. Drug Intelligence.

Briner, W. H., Ashburn, W. L., Harbert, J., and Di Chiro, G.: Cerebrospinal fluid rhinorrhea studies with the gamma scintillation camera. J. Nucl. Med.

Briner, W. H. and Numerof, P.:Reduction of Radiation Exposure in Nuclear Medicine. In Williams, K. D., Cooper, J. F., Moore, R. T., and Hilberg, A. W. (Eds.): Proceedings of a Symposium on the Reduction of Radiation Exposure in Nuclear Medicine, Work Group II Report. U. S. Department of Health, Education,and Welfare, Public Health Service Publ. No. 999-RH-30, Washington, D. C., U. S. Government Printing Office, 1967, 153 pp.

Bull, B. S.: On the distribution of red cell volumes. Blood.

Bull, B. S., Dutcher, T. F., and Siggard-Anderson, O.: The Hem-Aliquanter: A dispenser-dilutor for hematology. Amer. J. Clin. Path.

Cliggett, P. A. and Brown, J. M., Jr.: Assays of radioactive materials for use in patients--a five-year study. J. Nucl. Med.

Cotlove, E.: Anion measurements in biological materials. Ann. N. Y. Acad. Sci.

Cotlove, E., Young, D. S., Morton, G. W., and Trias, J. J.: Design of a fully automated discrete sample processing enzyme assay system for clinical chemistry. Clin. Chem.

Davidson, J. D. and Oliverio, V. T.: Tritium and carbon-14 by oxygen flask combustion. In Rothchild, S. (Ed.): Advances in Tracer Methodology Vol. 4, New York, Plenum Press.

DeMeo, A. N. and Lynch, J. M.: Updating tuberculosis control in occupational medicine. J. Occup Med.

Doppman, J. L.: Arteriographic identification of spinal cord blood supply prior to aortic surgery. JAMA.

Doppman, J. L.: Roentgenogram of the month. Dis. Chest.

Doppman, J. L., Di Chiro, G., and Glancy, D. L.: Collateral circulation through dilated spinal cord arteries in aortic coarctation and extraspinal arteriovenous shunts. An arteriographic study. Clin. Radiol.

Doppman, J. L., Di Chiro, G., and Ommaya, A. K.: Obliteration of spinal-cord arteriovenous malformation by percutaneous embolisation. Lancet.

Doppman, J. L., Di Chiro, G., and Ommaya, A. K.: Selective Arteriography of the Spinal Cord. St. Louis, Warren Green, Inc.

Duncan, A. E.: The cooperative efforts of the patient, physician, and nurse in the care of patient with carcinoma of the adrenals. Amer. J. Nurs.

Dutcher, T. F.: An efficient hematology work flow pattern. Bull. Clin. Path.

Ellis, G. L.: AS I SEE IT (discussion). "Nursing Issue--Educators, Nursing Service Administrators and Recent Graduates Analyze Expectations of the New R.N." Utah Nurse.

Freed, T. A. and Bosher, L. H., Jr.: Arteriographic demonstration of laceration of great vessels secondary to blunt chest trauma. Radiology.

Freed, T. A., Duncan, K., and Vinik, M.: Angiographic roll previewer. Radiology.

Freed, T. A., Neal, M. P., Jr., and Vinik, M.: The effect on bradykinin of renal arteriography: experimental observations. Amer. J. Roentgen.

Freed, T. A., Neal, M. P., Jr., and Vinik, M.: Radiographic findings in extracardiac vascular injury secondary to blunt chest automobile trauma. Amer. J. Roentgen.

Freed, T. A. and Vinik, M.: Effect of acetylcholine on renal arteriography: preliminary observations. Invest. Radiol.

Freed, T. A. and Vinik, M.: Mobile radiation protection barrier for use in arteriography. Amer. J. Roentgen.

Fried, D. M., Larson, L. M., and Salvanelli, M. L.: Splinting with a new thermoplastic material. J. Amer. Phys. Ther. Ass.

Gallelli, J. F.: Maintenance of sterility in freeze-drying of drugs. Amer. J. Hosp. Pharm.

Gralnick, H. R. and Dittmar, K.: The development of myeloblastoma with massive breast and ovarian involvement in acute leukemia. Cancer.

Gralnick, H. R. and McGinniss, M. H.: Immune cross-reactivity of penicillin and cephalothin. Nature.

Gralnick, H. R., Wilson, J. T., McGinniss, M., and Schmidt, P. J.: Drug-related positive direct Coombs tests. Amer. J. Clin. Path.

Gralnick, H. R., Wright, L. D., and McGinnis, M. H.: Coombs positive reactions associated with sodium cephalothin therapy. JAMA.

Greenspan, R. H., Simon, A. L., Ricketts, H., and Watson, J.: In vivo magnification angiography. Invest. Radiol.

Grindon, A. J.: A formula for exclusion of suspected hepatitis carriers. Transfusion.

Grindon, A. J., Holland, P. V., and Schmidt, P. J.: Posttransfusion hepatitis. Amer. Heart J.

Harbert, J. C. and Ashburn, W. L.: Radiostrontium bone scanning in Hodgkin's disease. Cancer.

Harbert, J. C., Ashburn, W. L., and Davidson, J. D.: An improved method of renography using the split crystal scintillation camera. J. Urol.

Holland, P. V., Menken, M., and Berlin, N. I.: Autoimmune hemolytic anemia, acute leukemia, and carcinoma of the lung. Arch. Intern. Med. (Chicago).

Howley J. R., Robbins, C., and Dickinson, M. D.: Thermoluminescent radiation dosimetry applied to dental x-ray exposures. Radiol. Health Data Rep.

Jones, E. A.: Goals for our next fifty years. J. Amer. Diet. Ass.

Laga, E.: Characteristics of phosphohydrolase and phosphotransferance reactions catalyzed by human placental alkaline phosphatase. Fed. Proc.

Lunceford, J. L.: Leukemia disease process, chemotherapeutic approach, and nursing care. Nurs. Clin. N. Amer.

McGinniss, M. H., Kaplan, H. S., Bowen, A. B., and Schmidt, P. J.: Agglutinins for "null" red cells. Transfusion.

MacLowry, J. D. and Marsh, H. H.: A semiautomatic microtechnic for serial dilution antibiotic sensitivity testing. Lancet.

Mohit, B.: Disc immunoimmobilization method for simultaneous typing and isolation of salmonella flagellar phases. J. Bact.

Peterson, C. C., Jr., and Silbiger, M. L.: Five ureters--a case report. J. Urol.

Peterson, C. C., Jr., and Silbiger, M. L.: Reiter's syndrome and psoriatic arthritis: their roentgen spectra and some interesting similarities. Amer. J. Roentgen.

Polissar, J.: Transfusion hepatitis: Use of statistical decision theory. Transfusion.

Ryschenkow, E. I., Wertlake, P. T., and Young, V. M.: Mycoplasma pseudocolonies from cultures of buffy coat of blood. Canad. J. Microbiol.

Schmidt, P. J. and Grindon, A. J.: Blood and blood components in the prevention and control of bleeding. JAMA.

Schmidt, P. J. and Holland, P. V.: Pathogenesis of the acute renal failure associated with incompatible transfusion. Lancet.

Schmidt, P. J., Holland, P. V., Lostumbo, M. M., Moss, K. I., and Sobota, J. T.: Hemoglobinuria due to anti-rh^{w}1(C^{w}): Observations on enzyme test procedures. Amer. J. Clin. Path.

Schmidt, P. J. and McGinniss, M. H.: Cell surfaces, blood groups and microorganisms. Nature.

Schulte, F. L. and Spence, H. W.: Repackaging liquids by a pump system. Hospitals.

Seipp, C. Y., Stahler, M., Ketcham, A. S., Barnett, R., Vreeland, R., and Dunn, K. L.: Hemipelvectomy with total pelvic exenteration: the challenge and the response. A nursing clinical conference. U. S. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health. Washington, D. C., U. S. Government Printing Office, 1968, 18 pp.

Silbiger, M. L. and Donner, M.W.: Morphine in the evaluation of gastrointestinal disease: a cineradiographic study. Radiology.

Silbiger, M. L., Pikielney, R., and Donner, M.: Neuromuscular disorders affecting the pharynx. Invest. Radiol.

Silbiger, M. L., Scott, S., Morrow, A. G., and Simon, A. L.: Correlation of chest roentgenograms and hemodynamic findings following surgical closure of secundum atrial septal defects. Radiology.

Silbiger, M. L., Scott, S., Morrow, A. G., and Simon, A. L.: Correlation of chest roentgenograms and hemodynamic findings following surgical repair of ventricular septal defects. Radiology.

Simon, A. L., Ross, J., Jr., and Gault, J. H.: The angiographic anatomy of the left ventricle and mitral valve in idiopathic hypertrophic subaortic stenosis. Circulation.

Striker, T. W. and Morrow, A. G.: Effect of succinylcholine on the level of serum potassium in man. Anesthesiology.

Sussman, H. H.: Evidence that the increased serum alkaline phosphatase activity in patients with osteomalacia or Paget's disease is from liver phosphatase isoenzyme. Clin. Res.

Sussman, H. H. and Laga, E.: Inorganic pyrophosphatase activity of human placental alkaline phosphatase. Biochim. Biophys. Acta.

Sussman, H. and Laga, E.: Orthophosphate as substrate for phosphotransferase reactions catalyzed by human placental alkaline phosphatase. Biochim. Biophys. Acta.

Sussman, H. H. and Laga, E.: Orthophosphate as substrate for phosphotransferase reactions catalyzed by human placental alkaline phosphatase. Science.

Sussman, H. H., Small, P. A., Jr., and Cotlove, E.: Human alkaline phosphatase--Immunochemical identification of organ-specific isoenzymes. J. Biol. Chem.

Williams, G. Z.: Effects of automation on laboratory diagnosis. Calif. Med.

Williams, G. Z.: Individuality of clinical biochemical patterns in preventive health maintenance. J. Occup. Med.

Williams, G. Z.: Laboratory automation systems: Availability and procurement. Bull. Coll. Amer. Path.

Young, D. S.: Systematic screening for abnormal urinary constituents. Clin. Chem.

Young, D. S. and Cotlove, E.: Evaluation of performance of a fully automated assay system. Clin. Chem.

Young, V.M.: Sections of shigellosis and colienteritis. In Jellfee, D. B. (Ed.): Disease of Children in the Sub-tropics and tropics. London, Ed. Arnold.

Young. V. M., Branche, W. C., Jr., and Lee, M. R.: Ultraviolet-induced colcines of Escherichia coli from the normal human intestine. J. Path. Bact.

Young, V. M., Lee, M. R., Branche, W. C., Jr., and Kenton, D. M.: Shigella flexnin antibody levels in 969 normal individuals. Amer. J. Public Health.

Zell, Z., Snyder, C., Mink, M., and James, C.: Nursing care of patients with pheochromocytoma. A nursing clinical conference. U. S. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health. Washington, D. C., U. S. Government Printing Office, 1968, 16 pp.

Zierdt, C. H., Webster, C., and Rude, W. S.: Study of the Anaerobic corynebacteria. Int. J. Syst. Bacteriol.

Combined Clinical Staff Conferences Published in ANNALS OF INTERNAL MEDICINE

The application of multicompartmental analysis to problems of clinical medicine. 68, No. 2: 423-448, Feb. 1968.

The biological properties of etiocholanolone. 67, No. 6: 1268-1295, Dec. 1967.

The circulating lymphocyte--Its role in infectious mononucleosis. (Scheduled for publication in August 1968.)

Cystinosis. 68, No. 4: 883-905, Apr. 1968.

The physiologic basis for therapy of classic hemophilia (Factor VIII deficiency) and related disorders. 67, No. 4: 856-882, Oct. 1967.

Physiologic basis of disorders of androgen metabolism. 68, No. 6: 1327-1344, June 1968.

Table 10

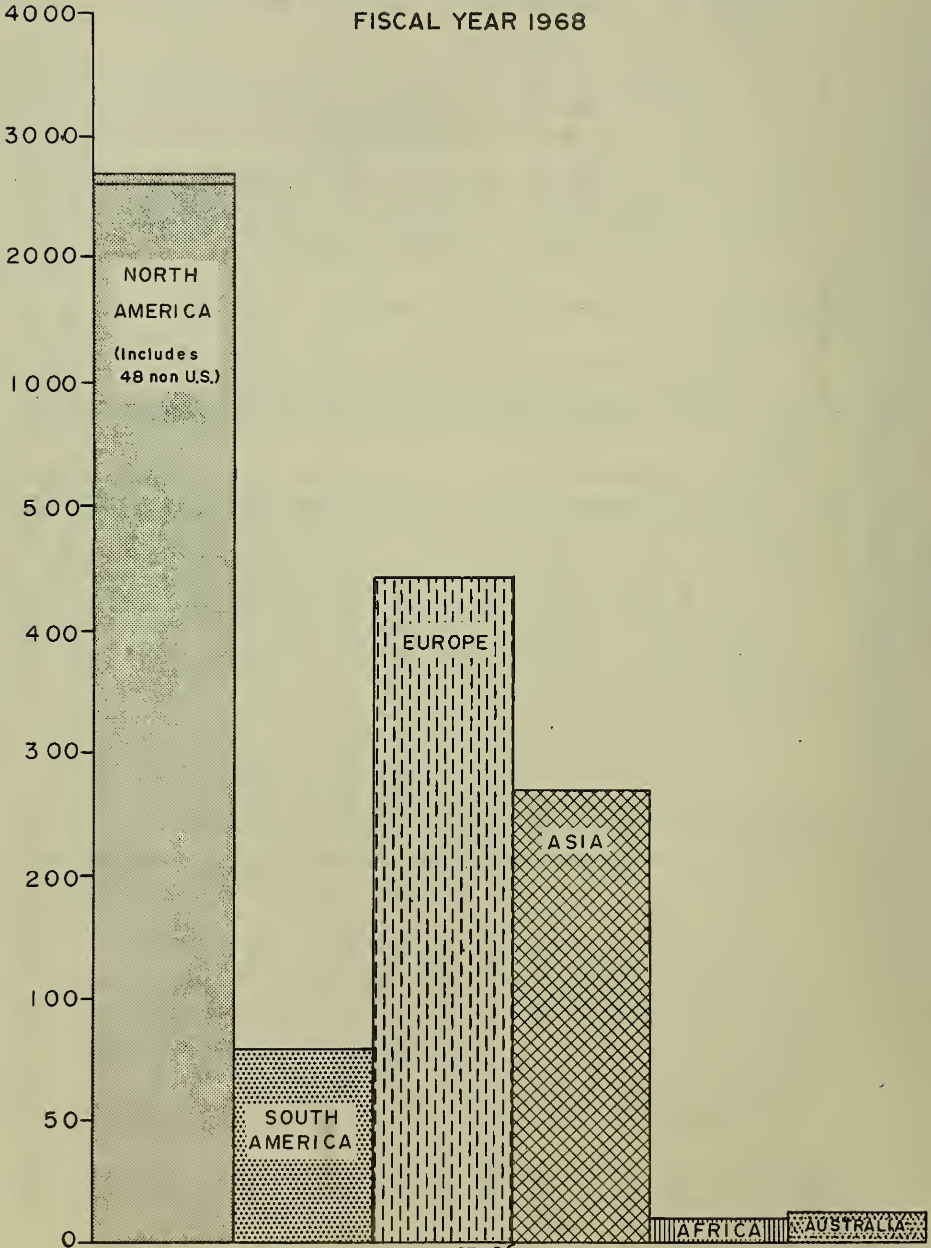
SPECIAL EVENTS SECTION ACTIVITIES

1967-1968	VISITORS			MEETINGS		TOURS		NIH MOVIE SHOWINGS		APPOINTMENTS WITH STAFF	SPEAKERS FOR OUTSIDE GROUPS	PUBS. DISTRIBUTED	INQUIRIES	
MONTH	For.	Dom.	Total	No.	Attendance	No.	Attendance	No.	Attendance				PUB.	CONGRESS.
July	47	322	369	9	1,290	33	114	38	338	57	4	1,625	175	1
Aug.	232	271	503	3	200	51	268	70	461	98	6	4,161	250	1
Sept.	184	161	345	9	1,688	22	109	43	306	86	7	2,503	300	2
Oct.	139	225	364	13	2,667	30	239	48	340	63	3	2,049	250	0
Nov.	27	104	131	11	1,788	20	73	28	113	28	1	456	100	0
Dec.	35	164	199	10	1,805	21	68	37	178	70	0	1,724	150	1
Jan.	39	149	188	12	1,726	25	107	36	169	31	2	1,408	150	0
Feb.	28	94	122	17	3,730	18	62	27	109	26	1	763	125	0
March	37	421	458	13	1,895	17	117	45	370	65	6	2,029	250	0
April	70	311	381	14	1,445	16	86	36	339	62	5	2,032	300	0
May	40	187	227	8	1,085	27	115	17	454	29	2	1,268	175	0
June	47	258	305	3	270	17	106	35	381	39	2	1,704	200	0
TOTAL	925	2,667	3,592	122	19,589	297	1,464	460	3,558	654	39	21,722	2,425	5

Table 11

DISTRIBUTION of VISITORS by CONTINENTS

FISCAL YEAR 1968



Section II

HIGHLIGHTS OF DEPARTMENTAL ANNUAL REPORTS

ANESTHESIOLOGY DEPARTMENT

Administration of anesthesia with related supportive treatment was accomplished in 1,152 instances during FY 1968. Although this was less than the total in FY 1966, it was nevertheless, only slightly less than the all-time high reached in FY 1965. Surgical operations accounted for 969 of the procedures and another 183 were concerned with diagnostic procedures performed with the aid of anesthesia.

Surgical Procedures, FY 1968

Thoracic	276
Neurosurgical	125
General	147
Kidney operations	22
Perineal	89
Head, neck, and face	115
EENT	43

Inhalation Therapy, FY 1968

Oxygen therapy	15,769	hours
Humid atmosphere therapy	58,000	hours
Aerosol therapy	4,329	hours
Intermitten positive pressure breathing with aerosols	56,971	treatments
Long-term respiratory assistance	13,905	hours
Short-term resuscitation and assisted respiration	1,467	hours

The Department performed 75 miscellaneous services consisting of diagnostic and therapeutic nerve blocks, consultations, and emergency resuscitation treatments. The majority of surgical and diagnostic procedures were complex and extensive requiring long periods of time. Anesthesia time exceeded 6 hours in 197 operations (17 percent), 5 hours in 283 operations (26 percent), and 3 hours in 550 operations (48 percent).

There was a sharp increase in the number of inhalation therapy treatments given during the past year. This increase may reflect, in part, the maintenance of more detailed records on patients receiving forms of therapy not necessitating constant surveillance by inhalation therapists. Inhalation therapists were assigned to emergency call duty on a 24-hour basis. A total of 31 calls for emergency assistance were received and answered. On all of these calls, the technician had to report from his home to the Clinical Center.

A number of laboratory and clinical research projects were conducted as clinical duty assignments permitted. Of those undertaken, the results of one were published and at least five more project reports with findings were submitted for review.

In the field of continuing education, inhalation therapists organized and conducted regularly scheduled orientation demonstrations in the use of inhalation therapy equipment for 192 new employees of the Nursing Department; conducted instruction in the use of positive pressure breathing devices for 41 professional nurses; collaborated with a staff anesthesiologist in instruction and training in advanced techniques of cardiopulmonary resuscitation for 59 professional personnel, including 7 staff physicians.

BLOOD BANK

FY 1968 was another year in which a perceptible trend in the more effective utilization of blood could be seen. Donations (accessions) totaled 16,308 units (pints); yet 20,962 transfusions were given. This was the fourth consecutive year the Blood Bank achieved a record of more than one transfusion for each pint of blood received.

Physical alterations in several locations were made to speed work flow. In the blood donor area a separation was made of the several varieties of donor traffic--specifically: small test blood samples; regular and experimental phlebotomy; and patients.

The Department accelerated its hepatitis surveillance of patients' posttransfusion to establish the incidence of the anicteric form of the disease in comparison with data on the icteric form. Because blood is received from several geographic areas, epidemiologic proof for differing rates of prevalence of hepatitis carriers among different donor populations was still being established when FY 1968 ended.

Two major training efforts were continued: medical technologists remained active in the 18-month on-the-job practical and didactic courses conducted jointly with the American Society of Clinical Pathologists; Clinical Associates continued participation in an intensive 2-year preceptorship in the Blood Bank Department for training and experience in the service and research aspects of immunohematology and transfusion practice.

The active relationship between blood groups and disease was demonstrated in several studies. Particular emphasis was given to infectious diseases and drug therapy. The most significant contribution, in collaboration with NIAID, developed the concept of the attack on the red cell membrane by the pleuropneumonia-like organisms.

CLINICAL PATHOLOGY DEPARTMENT

Increased emphasis on automation procedures performed in the routine laboratory reduced some impact of a greater workload on the Clinical Pathology Department staff. The implementation of on-line entry of test results by remote keyboard consoles coupled to a laboratory data-collector permitted a reduction of manual effort in marking result cards, so that only those tests which produce many results from a single request need be recorded in the computer by mark-sense result cards.

A system of monitoring the concentration of solutions was instituted which allows continual study of standard solutions for routine laboratory procedures. Collaboration with the Department of Nuclear Medicine was undertaken to improve the quality of analyses using radioactive materials.

During FY 1968, the methods used to perform many analyses were changed and others considerably modified; further development of the Enzyme Assay System was pursued to improve the reproducibility of results; the benefits of computer processing of data were seen in the daily printout of data on laboratory controls; the introduction of disposable containers and a novel system for urine preservation resulted in improved hygiene and greater efficiency in handling samples.

The Chemistry Service processed an average of 39,400 work units per month. This was an increase of 18 percent over the previous year.

Department staff members worked with members of the Bureau of Standards on the development and use of highly purified chemicals as standard materials for clinical chemistry. Staff members continued to work on instrumental design for automated urine analyses. During the latter part of FY 1968 equipment was being evaluated for the automatic separation of urine deposit and preparation of filtrate for chemical analyses. Development of new techniques for urine preservation and urine volume measurement was also undertaken. The number of test procedures available for the examination of urine was increased. Improvement in their accuracy, also, was achieved. New tests including chromatographic analyses of groups of compounds were developed and used on a pilot basis. This will be expanded to be available on a consultative basis. In cooperation with the staff of the Molecular Anatomy Program of the Oak Ridge National Laboratories, highly sophisticated equipment will be used to study the compositions of urine toward development of new diagnostic tests for systemic diseases. (For statistics and additional data, see the Clinical Pathology Department Report, pp. CP-1-32.)

DEPARTMENT OF DIAGNOSTIC RADIOLOGY

Accomplishments during FY 1968 included provisions for a complete diagnostic radiological service for Clinical Center patients; an emergency X-ray service, and a routine chest X-ray facility for all NIH employees; also, a chest X-ray interpretation service for employees of the Rocky Mountain Laboratory, Hamilton, Montana.

A total of 44,777 X-ray examinations were performed on 26,462 patients which included 1,405 special diagnostic X-ray studies utilizing contrast materials and catheters to study various organ structures of the body. Approximately 600 X-ray studies per month were performed on NIH employees; at least 40 percent of these were new employees or applicants.

The Department staff made significant contributions to many professional conferences and programs throughout the year including: a monthly teaching conference on congenital heart disease for the Radiology Department at the Bethesda Naval Hospital; a monthly peripheral vascular conference for the staff and resident radiologists at Johns Hopkins Hospital; and contributions to the weekly NCI lymphoma staging conference. Staff members also presented demonstrations, speeches, papers, and seminars at various professional meetings around the country.

Contributions to research programs were numerous and varied, as listed in the Department's full report, pp. DR-1-14. Technical research on techniques and equipment continued throughout the year. Four diagnostic X-ray rooms were completely renovated and new equipment installed. Two rooms were changed in function and equipped with some new and some on-hand instruments. Of the new equipment installed, a Philips-Massiot Polytome had produced spectacular results by the end of FY 1968. This is a tomographic unit (there are only 20 of these in the country) which allows five different tomographic motions producing equivalent varying results. The finest bone detail can now be perceived and provided for study.

Twenty-six publications were authored or co-authored by the 10-member radiologist staff during FY 1968.

X-ray Examinations, Fiscal Year 1968

	Patients	X-ray examinations
Inpatients	14,347	26,735
Outpatients	5,233	11,019
EHS	6,882	7,023

Future plans include continuation of the modernization program and completion of the replacement of obsolete equipment. This involves one more room in the Department and the 10A heart catheterization laboratory. Plans to partially replace the standard X-ray generators with constant potential generation are under consideration. Consideration was also given to the possibility of installing an X-ray facility in the Admissions and Follow-up area and the plan is under study.

EMPLOYEE HEALTH SERVICE BRANCH

The Branch provided 24-hour emergency medical care for NIH employees and conducted a variety of specialized programs of health care assistance during FY 1968.

Management of work-related injuries and illnesses continued to improve. The Bureau of Employees' Compensation's current policy of appointing private physicians in the Washington area as BEC designated physicians to whom the Branch can refer work-connected injuries was very succesful. During FY 1968, two orthopedic surgeons were added to the list of surgeons and internists. Permission was also granted to refer work-connected eye injuries to some area ophthamologists, thereby reducing the burden on the NINDB Eye Clinic.

Visits by Employees to EHS, by Fiscal Years

1968	1967	1966	1965
25,787	26,980	26,050	25,405

An evaluation of transportation for ill or injured employees was conducted and resulted in an improved system in the Clinical Center. The role of the R&W Emergency Transportation Fund was reviewed and clarified (R&W, as necessary, will pay taxi fare for ill employees who are sent home).

Complete periodic physical examinations including, when indicated, proctoscopic examinations and EKG's with Master's Tests, were performed on several occupational groups. The Fire Department and Ground Force personnel were offered periodic examinations because these individuals must be able to respond to emergencies without endangering either their own health or the safety and welfare of others. Formula Room and Primate Quarantine Unit of Laboratory Aids Branch personnel were also offered examinations because of the hazardous nature of their work.

An extensive immunization program for employees continued during FY 1968. In addition to providing immunizations for international travel, active programs for employees exposed to infectious disease agents continued. Available vaccines and boosters were offered as the anniversary date of a regular interval occurred. Influenza immunizations given during the fall season in cooperation with a DBS study totaled 3,793. Information was sought to determine the effectiveness of influenza virus vaccine along with information on the incidence of reactions to influenza vaccine. Evaluation of data was begun.

During the year, the hearing test program was improved. This program is directed to employees who are exposed to high level noises in their work environment, particularly those in the Power and Airconditioning plant. Audiometric examinations were performed under controlled conditions in a newly installed sound-conditioned booth.

As in other years, emotional disorders constituted the most difficult employee health problem. Three psychiatric consultants spent 3 days a week in Employee Health Service and offered counseling to troubled employees. Several "Seminars for Supervisors" were held to assist supervisors in recognizing early signs of emotional health problems, including chronic drinking, in their employees.

Medical monitoring and surveillance of the Primate Quarantine staff was re-evaluated. Preparations were made to carry out recommendations that employees assigned to this area have annual physical examinations including extensive laboratory procedures.

Plans were virtually completed for the opening of three new Employee Health Units during FY 1969, one serving Buildings 37 and 38, another located in the Barlow Building, and the third in the NCI Viral Containment Building.

ENVIRONMENTAL SANITATION CONTROL DEPARTMENT

During FY 1968, an average of 236 wage-board employees in three units were actively engaged in cleaning the Clinical Center's more than 1,250,000 (gross) square feet of patient, laboratory, and miscellaneous space.

A continuing program of evaluating cleaning equipment revealed, among other things, design problems in newly-marketed products. The careful testing and selection of mechanized equipment minimized the number of purchases of poorly designed equipment, thereby reducing costs and lost manhours. NIH Procurement Section accepted an improved GI can dolly design developed by the D&T Section, which has a low noise level when a GI can is being transported. The conversion of dollies to the new design was begun. A study of chlorinated scouring powders was completed. As a result, use of GSA "chlorinated" scouring powder was discontinued in the Clinical Center. The possibilities of spontaneous combustion in stored oil-treated dust mops was investigated. A 1 to 3° F. temperature rise in the storage containers indicated that ESCD storage practices were satisfactory.

Floor cleaning procedures in a selected area were evaluated by use of bacterial sampling. It was found that vacumming prior to mopping could be eliminated. Bacterial build-up on floors 4 hours after wet mopping was found to be approximately 34 percent of the total count prior to mopping. The use of a disposable dust mop 4 hours after wet mopping was found to reduce the Staph aureus level to that found immediately after mopping with germicidal detergent.

Substantial progress was made in the Department's systems analysis study (SAS) of housekeeping operations. The SAS team completed studies, developed schedules, trained employees, and implemented system concepts in 37 areas, which is 65 percent of the Clinical Center studied. Five more areas were partially implemented. Manpower savings realized by this study were used to establish project cleaning teams that were trained for specialized cleaning tasks. Additionally, the section prepared to accept cleaning responsibility for approximately 78,000 gross square feet of new construction areas in the new library and "D" wings with no increase in the personnel ceiling.

Continuing efforts were made toward the development of an inspection system which will provide a numerical index for the overall level of cleanliness, orderliness, and maintenance in the Clinical Center. Interest was shown in the project by the Computation and Data Processing Branch, Division of Computer Research and Technology. Discussions indicated that machines were not necessary but a method of manual techniques was suggested for trial purposes.

The Department pursued a vigorous training program that included personnel attending specialized seminars, courses, meetings, and demonstrations. The emphasis was shifted this year. Supervisory training was directed toward active class participation in problem solving sessions. The all-employee group training was changed from monthly to bi-monthly sessions. A complete re-evaluation of training aids produced during the past few years was initiated.

Requests for copies of the Department's Cleaning Procedure Manual were received from 200 individuals and organizations in various states and several foreign countries.

NURSING DEPARTMENT

Although demands for nursing services consistently exceeded those that could be met by available personnel during FY 1968, no reduction in the elements of essential care occurred and nursing support for clinical research was provided with cooperation, interest and dedication of all categories of personnel.

To assure the best possible utilization of staff and resources, a complete review of Nursing Department activities was conducted. Results of that review included: revised scheduling, increase in number and types of education programs, improvements in communications techniques, and a new priority system for coping with periods of stress which safeguards the patient and protects the clinical studies.

Establishment of two plans for reorganization of routines on two nursing units proved moderately effective in achieving better use of personnel.

A conference of administrators of nursing services was held to review administrative problems of nursing service and to develop solutions to the most pressing ones.

A workshop on communication was held for head nurses. The workshop on personnel evaluation was again conducted for senior staff nurses who had not been oriented to this type of responsibility.

Members of the nursing staff made 30 visits to schools of nursing during FY 1968 as part of the CC nurse recruitment program. Many of the visits were made at the request of faculties in schools that had received prior visits by Clinical Center representatives.

NUTRITION DEPARTMENT

The Nutrition Department continued to play a vital role in the care and attention given to Clinical Center patients as individuals. Those patients more seriously ill were visited before each meal and encouraged or gently coaxed to eat; diets were prepared to accommodate special food preferences and whims of patients; meticulous attention was given to the preparation of each meal and helped to boost the morale of even the most dejected patient.

In FY 1968, the Nutrition Department served 333,310 patient meals. Food intakes were calculated and recorded for an average of 91 patients every day, and fluid intakes for an average of 56 patients each day. This required weighing at least three and up to six trays of food, and two to three nourishments for each patient. The Nutrition Department also gave individual discharge and followup diet instruction on 565 occasions.

Twelve floor kitchens, a "Life Island" service kitchen, a formula room, the main kitchen, and two additional metabolic units operated the full 12 months of FY 1968. Another metabolic kitchen operated 11 months and was closed the twelfth for staff vacations.

Because of the increased need for bland diets (due in part to the results of treatment with a number of new medications) a cycle bland menu was initiated during the year. Special menus for Thanksgiving and Christmas were prepared.

The Nutrition Department phased out its operation of the Clinical Center Cafeteria in February 1968. As a result of 2 years of planning, 43 eliminated positions were staffed at the end with temporary employees so that no career conditional employees lost status.

A fluctuating and unpredictable workload continued to be one of the Department's severest problems. A wide variation occurred in the types and kinds of diets requested. During FY 1968 Clinical Center patients, generally, were more seriously ill than those of previous years and required more therapeutic diets for their medical care needs as well as more dietary adjustment as part of their treatment. There was an average of 83 diet changes each day during the year. In addition, there was a sharp increase in the number of trays (meals) that had to be held to be served at a later hour than originally scheduled. These averaged 75 delayed trays per day.

A manual for the operation of a metabolic kitchen unit was completed. It describes in detail the procedures used by the three metabolic units of the Nutrition Department. A 15-minute color movie, prepared in conjunction with the Plant Safety Branch for use in the training program of the Nutrition Department, was completed.

NUCLEAR MEDICINE DEPARTMENT

Although in only its first full year of operation, the Department of Nuclear Medicine nevertheless conducted 3,246 complete studies. This figure represents a 23 percent increase over FY 1967. The use of radioisotopes was approximately 20 percent greater during the year measured by amount of activity ordered, number of shipments received, and cost.

The number of radiopharmaceutical assays rose from 3,920, FY 1967, to 4,700, FY 1968--a 20 percent increase. A dramatic increase of 375 percent was experienced in bioassays (radiourinalyses) due to the need for increased surveillance of relatively large numbers of staff working routinely with high levels of ^{32}P and ^{3}H.

Over 1,300 laboratory or other surveys were performed in 18 buildings compared to 350 in FY 1967. Training an additional technician combined with some overtime work allowed this tremendous increase.

Thirteen thousand eight-hundred-ninety-one film badges were developed (a 13 percent increase over FY 1967) and 603 new badges were issued (28 percent above FY 1967). Two 10-day radioisotope training courses were held at NIH and another was conducted at the National Center for Radiological Health, Rockville, Maryland. A total of 140 participants received training in the three courses. Release of funds in May by BOB enabled approval to be given for construction of an addition to the Radioisotope Laboratory. Although there were no changes in personnel or space, the Diagnostic Radioisotope Section improved facilities with the installation of an automatic X-ray film processing unit. Additionally, a Positron III attachment for the gamma scintillation camera purchased by NINDB was installed in May.

Substantial collaborative work was done with the Radiopharmaceutical Service of the Pharmacy Department. Evaluation of technetium sulfur colloid and other agents continued. A major effort was made to develop techniques for recording dynamic studies of the heart and certain regional major blood vessels. With the Clinical Center Television Engineering Unit, effective means were devised for video tape recording images produced by the gamma scintillation camera. The technique was evaluated in NHI patients and promising findings were reported at several scientific meetings.

An increasing workload and shortage of personnel and space inspired continuous planning toward even greater efficiency. A contract for the construction of the addition to the Radioisotope Laboratory was expected to be finalized in the final quarter of FY 1968 with possible occupancy within a year. Preliminary conferences were held with the National Bureau of Standards' reactor staff for use of the facility by NIH scientists.

MEDICAL RECORD DEPARTMENT

In FY 1968 the Medical Record Department continued its strict adherence to the policy of assuring completeness, accuracy, safekeeping, and availability of medical records and the adjunctive responsibility of record controls.

The Department was reorganized in March and gained official recognition for the following designations: Office of the Chief and four sections: Files, Record Processing, Medicolegal, and Transcribing. Approval was granted for an additional tour of duty (5:00 p.m. to 10:30 p.m.) in the Files Section.

Additional filing space was acquired allowing transfer of 14,000 medical records to the new area and the inception of an ongoing program of record retirement. Installation of new transcribing equipment resulted in improvement in the quality of medical reports.

Orientation of new employees from this and other Clinical Center departments and from the Institutes was accomplished. Lecture tours were given to PHS medical record librarian students and other visitors. Key personnel attended seminars, meetings, and the annual convention of Medical Record Librarians.

PHARMACY DEPARTMENT

Increases in workload during FY 1968 in all sections were noted and the Service chiefs again registered their concern about limitations of personnel, budget, and space. Although, for these reasons, product development in the Radiopharmaceutical Service was seriously curtailed, one new product was developed, which in preliminary clinical trials, showed considerable promise. The Service also developed a new liver scanning agent, microaggregated human serum albumin labeled with Tc-99m. In initial clinical trials, a remarkable diminished splenic uptake of this agent, when compared with other liver scanning agents now available, was noted. This makes possible a more definitive scan of the left lobe of the liver which frequently is shaded by high splenic localization of other liver scanning agents. Continued clinical use of this material may indicate a breakthrough in this difficult scanning problem.

Extramural attention was again directed toward the Radiopharmaceutical Service; many nuclear medicine departments and medical school staffs consulted this Service on matters relating to the safe formulation of radiopharmaceutical products.

The general workload of the Pharmaceutical Development Service increased in FY 1968 due, in part, to the additional information required by the FDA with regard to drug safety and efficacy. More time was spent in assaying and quality control testing of products formulated prior to their release for patient use. Data concerning personnel, facilities, and controls for processing a new drug were updated and resubmitted to FDA. Seven groups (20 pharmacy officers) of USPHS Hospital Pharmacy Residents were trained in sterile extemporaneous compounding of bulk intravenous solutions.

A policy to put an expiration date on each prescription dispensed was instituted to help insure greater safety in its use. To better handle the problem of inventory depletion, the practice of dispensing a partial quantity of a large requirement immediately and the remainder at a later date brought good results.

Stock control and inventory procedures in the Central Sterile Supply Service were monitored more closely during FY 1968. Periods of time during which supplies were not available were minimized, although procurement problems at times were serious. Efficiency of the Service improved to the point that very little overtime was required to handle the increased workload.

A more efficient storage system for intravenous and irrigating solutions was achieved. A system of mobile carts was employed facilitating neater and more orderly storage of these items. Studies continued of receiving, processing, and issuing procedures of this Service to effect further increases in operating efficiency and the quality of supplies used in the patient care areas.

The Office of the Chief devoted considerable attention to the streamlining of procurement functions delegated to the Pharmacy Department and stock control procedures within all areas of the Department.

Contributions and activities by Pharmacy Department staff members within the profession were prolific and significant. These included participation in active memberships, lectures, seminars, meetings, and extensive contributions to the literature of the profession with 16 papers or articles published or in press. For additional Pharmacy Department data, see pp. Ph-1-13.

REHABILITATION DEPARTMENT

The basic function of patient treatment, using recognized, effective measures of physical, occupational, and speech therapy, was performed by the Rehabilitation Department during FY 1968. A large number and wide variety of tests and measurements were carried out for Institute physicians primarily for evaluation of functional ability and progress, but also in connection with diagnosis and determination of effectiveness of drug and other therapy.

Continuing programs included: evaluation of casts and splints in the treatment of patients having joint pain, contractures or deformities; long-range, follow-up evaluation of NINDB patients who had stereotaxic operative procedures; evaluation and treatment of patients with cystic fibrosis, using the most up-to-date methods; pulmonary function tests in patients with acromegaly, scleroderma or hyposmia; evaluation and treatment of patients with rheumatoid arthritis and knee synovectomy.

Number of Different Patients Treated, FY 1968

Physical Therapy	1,668
Occupational Therapy	5,513

New programs in FY 1968 included: study of patients with spinal arteriovenous malformations involving pre- and postoperative evaluations by the Physical Therapy Service and manual and quantitative muscle testing, and evaluation of functional abilities with specific postoperative therapy; quantitative muscle testing of patients with amyotrophic lateral sclerosis.

The Occupational Therapy Service developed a special program for NIAMD patients with Lesch-Nyhan syndrome involving a new type of splint appropriate to their capacities and needs.

Vigorous training programs for members of the Rehabilitation Department staff were conducted during the year. Attendance at conferences, lectures, and miscellaneous medical ward rounds conducted by clinical investigators, as well as staff meetings and orientation sessions for the Occupational and Physical Therapy staffs were common practice during the period. Staff members also participated in many professional activities off the NIH reservation. (See statistical data, pp. Rh-8-20.)

SOCIAL WORK DEPARTMENT

FY 1968 was a period in which social workers provided services to the greatest number of inpatients, outpatients, and family members in the Department's history. These vital services were rendered in a year when the Department experienced unusual personnel turnover as well as a reduction in size by two positions due to a "ceiling freeze."

The Department's average monthly inpatient coverage for the first nine months of the year was 73 percent. A full range of social work services was provided each month for an average of 433 inpatients and 208 of their family members. As usual, the primary aim of social work was to help patients and family members cope with emotional problems of illness and disability, and adjust to the hospital experience. Rendering this asistance helped maximize patient response to medical care and prospects for rehabilitation.

The Patient Welfare Fund served a crucial need by providing services and paying emergency expenses for Clinical Center patients and families that could not be handled with Government appropriated funds. Instead of donating a percentage of vending machine profits for support of this fund, the NIH Recreation and Welfare Association in FY 1968 committed its organization to a regular contribution of $8,000.00 annually. The total amount expended in the first 9 months of FY 1968 was $10,325.09. Of this, 70 percent was spent for family members whose presence was necessary during a crisis in a patient's illness.

General Expenditures Areas, Patient Welfare Fund, FY 1968

Patient activities (unit parties, supplies, etc.)	2.9%
Patient transportation	5.2%
Basic necessities (small weekly spending allowances for patients without funds)	12.1%
Allowance to relatives	70.0%

(For statistics and additional data, see the Social Work Department Report, pp. SW-1-40.)

Six new members joined the staff. Each was considered mature and had a background of excellent work experience; therefore, all were able to assume their respective job responsibilities quickly.

A staff review of social work practices begun late in FY 1967 was continued during FY 1968. Between March and May 1968, all staff members were asked to report certain demographic and other data related to all patients known to the Social Work Department during March and those who remained in the hospital through May. It is expected that this information will provide a framework to view and improve upon existing high-quality practices. The committee continued to work with the problem of developing a method for identifying the nature and quality of casework intervention and for classifying areas of social work concern and expertise.

Participation by Department staff in professional activities was prolific. Two staff members took the Doctoral Seminar in Social Casework at Catholic University; one-third of the staff attended one or more out-of-town professional meetings embracing a wide range of current interests; lectures, conferences, seminars, active memberships in professional organizations, symposia, and panels were also included in the activities.

DEPARTMENT OF SPIRITUAL MINISTRY

The basic objective of the Spiritual Ministry Department was fulfilled again in FY 1968. Patients' needs for spiritual help resulted from the emotions of loneliness, grief, fear, guilt, anxiety, loss of spiritual meaning, and boredom. Help was provided through pastoral conversations, sacraments, blessings, prayer, scripture, and worship. Members of the staff conducted religious services in the interfaith chapel, visited patients and their families, consulted with Clinical Center personnel, and acted as liaison with religious groups not represented by staff chaplains.

Rabbi Maurice Kleinberg joined the Department staff in November 1967. Rabbi Kleinberg is a former Army chaplain with wide experience, including 11 years' service at Walter Reed Medical Center.

The training of clergymen assumed an increasingly important role. It helped to increase daily coverage to patients and strengthened the total program of the Department. Interest in hospital-based training for military chaplains was indicated and resulted in the establishment of a training program for four professional chaplains (three Army, one Navy) in the spring quarter. In addition, six seminarians completed an 11-week pastoral training course conducted by CC chaplains.

A program using normal volunteers studying the problem of "informed consent" was conducted during the summer. Informal discussions were held with staff members of the various Institutes and a research study was proposed.

Members of the Department were involved in a variety of community concerns of local churches, council of churches, denominations, chaplaincy organizations, and training organizations.

Case records again demonstrated the importance of a continuing religious experience for the ill, particularly for those with terminal illnesses and for their families.

Section III

CLINICAL CENTER DEPARTMENT REPORTS

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

ANESTHESIOLOGY DEPARTMENT

CC-23
Serial No.

TABLE OF CONTENTS

General . . . . An- 1
Anesthesiological Procedures . . . . An- 2
Inhalation Therapy Activities . . . . An- 4
Emergency Call Activities . . . . An- 5
Research Activities . . . . An- 5
Major Problems . . . . An- 7
Changes and Improvements . . . . An- 7
Future Objectives . . . . An- 8
Publications . . . . An- 8

Individual Project Reports

The Human Neuromuscular Refractory Period . . . . An- 9
The Effect of Methoxyflurane Anesthesia on the Ability of the Kidney to Concentrate Urine An-13

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

ANESTHESIOLOGY DEPARTMENT

CC - 23
Serial No.

GENERAL

The Anesthesiology Department, as its primary mission, provided anesthesia and related services, including inhalation therapy, for patients hospitalized at the Clinical Center. A relatively small staff, averaging 21 in number, composed of fully qualified physician anesthesiologists, nurse anesthetists, medical technicians, with special capabilities and skills, and secretarial personnel performed this work. Physician and nurse anesthetists were primarily concerned with the administration of anesthesia and necessary supportive treatment for patients undergoing major operative surgery and diagnostic procedures, requiring either general or local anesthesia in situations where it was necessary to keep the patient under close medical surveillance. Anesthesia technicians provided support for the anesthetist personnel. Inhalation therapists were responsible for the conduct of all types of inhalation therapy utilizing oxygen and mechanical measures for respiratory assistance. Extracorporeal apparatus technicians were concerned with the operation of the pump oxygenator for the maintenance of respiration and circulation during open heart surgery. Research projects were carried out by staff anesthesiologists insofar as their clinical duties and the availability of appropriate facilities permitted. Laboratory facilities, to a limited extent, were made available by NHI.

The numbers and types of personnel on duty during the fiscal year 1967 were categorized as follows (figures based on yearly average):

Clinical Anesthesiologists[1]	8.0
Research Anesthesiologist[2]	1.0
Visiting Anesthesiologist[3] (BEI, Research Services)	0.1
Nurse Anesthetists	3.0
Inhalation Therapists	4.0
Extracorporeal Apparatus Technicians[4]	0.5
Anesthesia Technicians	3.0
Secretaries[5]	2.0

---

1. Some time devoted to clinical or laboratory research.
2. Was assigned to clinical anesthesia duties on emergency call rotation and for scheduled surgery whenever needed.
3. A certified anesthesiologist, assigned to Biomedical Engineering and Instrumentation Branch, DRS, served in a clinical capacity one or two days per week depending on surgical schedules.
4. The position for an extracorporeal apparatus specialist and two vacancies for similar position, were reassigned to the Nursing Department, CC, January 1968.
5. One secretary employed on a part-time basis (3 days per week).

ANESTHESIOLOGICAL PROCEDURES PERFORMED

The administration of general and other forms of anesthesia with related supportive treatment was carried out in a total of 1,152 instances. Surgical operations accounted for 969 of the total procedures with the remainder of 183 being concerned with diagnostic procedures performed with the aid of anesthesia. In addition, there was a total of 75 miscellaneous services consisting of diagnostic and therapeutic nerve blocks, consultations and emergency resuscitation treatments. The majority of the surgical and diagnostic procedures performed were of a complex and extensive nature over relatively long periods of time. Many of the patients involved were seriously ill with their survival contingent on the success of the surgery. Anesthesia time exceeded three hours in 550 operations (48%), five hours in 283 operations (26%), and six hours in 197 operations (17%). These observations concerning the duration of surgery have been consistant from year to year.

Surgical operations were classified according to type of surgery and the use of special adjunctive techniques as follows:

1. Thoracic (cardiac, pulmonary, great vessels, superficial chest)	
a. with extracorporeal circulation technique	166
b. closed technique	104
2. Neurosurgical	
a. craniotomy	81
b. craniotomy, utilizing hypothermia	3
c. total body hypothermia combined with drug therapy	7
d. sterotaxic procedures, including thalamotomies	12
e. spinal cord operations	15
f. other	7
3. General surgical (abdominal, pelvic and inguinal)	147
4. Kidney operations, including bladder and adrenal gland	22
5. Perineal (gyn-68, genito-urinary-17, others-4)	89
6. Head, neck, and face	115
7. Eye, ear, nose, and throat	43
8. Dental	66
9. Orthopedic	33
10. Miscellaneous procedures	59
Total	969

Perineal operations included diagnostic culdoscopy for the study and photographing and the performance of surgical biopsy of pelvic organs.

While the number of surgical procedures increased somewhat over the previous year, there was a substantial decline in the number of diagnostic procedures requiring the service of an anesthetist, from 308 to 183. A clinical study involving the use of general anesthesia for ambulatory dental patients was resumed during the middle of the year, after having been discontinued in April 1966.

Aside from the dental surgery performed by NIDR, procedures performed by the surgical branches of NCI, NHI, and NINDB, fell into the following categories:

1. NCI- extensive excision procedures for the treatment of cancer
2. NHI - operations on the heart and great vessels for the correction of congenital and acquired defects, the majority of these procedures utilizing extracorporeal circulation techniques
3. NINDB - surgery of the brain to localize, and remove irritative epileptogenic foci, and neoplastic tumors and the treatment of abnormal movement and tonus syndromes by sterotaxic techniques

Because of the complexity and duration of many of the surgical procedures, a team of two anesthetists (two anesthesiologists or an anesthesiologist and a nurse anesthetist) and an anesthesia technician were assigned to care for the patient. The composite operations involved in the manipulation of anesthesia equipment, physiological monitoring apparatus, thermal devices and blood transfusion equipment justified a staff of more than one anesthetist.

Extracorporeal apparatus technicians had the responsibility for assembly, maintenance and operation of the pump oxygenator used to replace the patient's heart and lung functions during open heart surgery. Considerable time and effort were required to process and sterilize the components of the pump oxygenator which is used four or more days per week. Careful attention to detail as well as a background knowledge of the medical principles involved in open heart surgery are required of these technical personnel. One hundred sixty-six successful extracorporeal perfusions were accomplished during the year.

Diagnostic studies done with the aid of anesthesia totaled 183, a figure which has progressively declined through the years as fewer involved neurological diagnostic procedures are being carried out, and often times, local anesthesia is employed rather than resorting to the use of general anesthesia. Many of the patients managed by anesthetists during diagnostic studies were small children. The use of heavy, or "controlled sedation," for the performance of cardiac catheterization studies, continued as our choice of anesthetic management.

Diagnostic studies on patients with incapacitating illnesses are capable of causing serious circulatory and respiratory derangements. Careful surveillance of vital signs was an essential component of the anesthetic management when dealing with such patients.

Diagnostic tests done under general anesthesia were:

Pneumoencephalograms	19
Cerebral arteriography	12
Special eye or ENT examinations	3
Cardiac catheterization procedures	71
Cystoscopy	25
Miscellaneous, including cardioversions	52

The Institutes responsible for the admission of surgical patients requiring anesthesia are listed below; the first four Institutes listed have surgical services.

Institute	Procedures	Percent
NCI	448	39.0
NHI	382	33.0
NINDB	181	15.7
NIDR	54	4.7
NIAMD	62	5.4
NIAID	21	1.8
NIMH	4	0.35

Surgical and diagnostic procedures on the above patients were carried out by the surgical services of the following Institutes:

Institute	Procedures	Percent
NCI	517	45.0
NHI	375	32.5
NINDB	194	17.0
NIDR	66	5.5

INHALATION THERAPY ACTIVITIES

The Anesthesiology Department maintains an Inhalation Therapy Section staffed by four trained inhalation therapists. Consultation services were provided by an anesthesiologist. The numbers and types of treatments during the fiscal year 1968 were:

Oxygen therapy (tent, mask, catheter)...............	15,769 hours
Humid atmosphere therapy............................	58,000 hours
Aerosol therapy.....................................	12,055 treatments
Intermittent positive pressure breathing with aerosols...............................	56,971 treatments
Long-term respiratory assistance....................	13,905 hours
Short-term resuscitation and assisted respiration..	1,467 hours

There was an apparent increase in the number of inhalation therapy treatments given during the past year. It would appear that this apparent increase resulted from the keeping of more complete records on patients receiving forms of therapy not necessitating constant surveillance by inhalation therapists. Improvement in records became possible after filling several vacancies with trained therapists. A system for the making of regular rounds for the purpose of visiting all patients receiving any form of inhalation therapy, rather than only those requiring the special attention of inhalation therapists, was instituted.

Educational Activities

Inhalation therapists organized and conducted teaching sessions as follows:

1. Regularly scheduled orientation demonstrations in the use of inhalation therapy equipment for 192 new employees of the Nursing Department (nurses and aids).

2. Instruction in the use of positive pressure breathing devices for 41 professional nurses.

Inhalation therapists collaborated with a staff anesthesiologist in providing instruction and training in advanced techniques of cardiopulmonary resuscitation for 59 professional personnel, including 7 staff physicians.

Emergency Call Activities

Inhalation therapists were assigned to answer calls for emergency call duty on a 24-hour basis. An average of 3.5 therapists were available for this purpose. A total of 31 calls for emergency assistance were received. In each instance the technician on call had to report from his home to the Clinical Center. Personal inconvenience and the expense involved in travel outside regular working hours were involved in 24-hour coverage.

RESEARCH ACTIVITIES

When clinical duty assignment permitted, laboratory and clinical research investigations were conducted. The lack of laboratory facilities under our direct control made it necessary to secure help from the Institutes. NCI cooperated in this aspect. The projects on which our staff members worked may be summarized as follows:

1. Dr. Philip Mann worked on 2 related projects in which studies of the relationship of diminished surfactant activity in the lung lining following experimentally produced pulmonary embolism was involved.

    a. Pulmonary emboli were produced by standard techniques with glass bead emboli of varying sizes. A significantly diminished surface activity, as measured by the bubble stability technique, was demonstrated in lungs embolized by 100 and 28 micron diameter particles. This project was completed during the year and publication of the results is in preparation. A project report is attached.

    b. A second related study was begun to investigate pulmonary alveolar surface tension following administration of protamine, in an attempt to relate postoperatively pulmonary complications in patients who had received protamine following open heart surgery. The project is in progress. No definite findings reported to date. A project report is attached.

2. Dr. Theodore Striker completed a clinical study dealing with the effects of succinylcholine on blood levels of potassium in digitalized and non-digitalized patients undergoing open heart surgery. Dr. A. G. Morrow, Surgical Branch, NHI, collaborated in the study. The project was completed at the beginning of the current fiscal year. The findings indicated

significant rises in serum potassium in patients receiving succinylcholine as compared to patients receiving d-tubocurare. No relationship was found between hypercalcemia and the occurrence of cardiac arrhythmias, even in digitalized patients. Results of this study were reported at the annual meeting of the American Society of Anesthesiologists in Las Vegas in October 1967. As noted in the bibliography, publication of these findings appeared in ANESTHESIOLOGY.

3. Drs. C. L. Hebert, W. M. Dixon, Charles Battig (DRS), and Edward Driscoll (NIDR) resumed a study involving physiological changes which occur following the use of various anesthetic agents and techniques for ambulatory patients undergoing multiple dental extractions. This project was discontinued in April 1966, when Dr. Driscoll left his clinical work to take on administrative duties. It was resumed December 1967. The project is sponsored by NIDR. It requires the collaborative services of two anesthesiologists and one anesthesia technician, in addition to the dental surgical team. The average patient accepted for this study undergoes four sessions of surgery utilizing nitrous oxide and intravenous methohexital anesthesia. Halothane or other agents are used during two of the sessions, with the patient serving as his own control. Numerous physiological parameters including blood pressure, pulse, arterial blood oxygen saturation, electrocardiogram, electroencephalogram, and respiratory excursions of the chest are studied. The short period since the resumption of this study has been devoted chiefly to orientation and training of the supporting team members. One-half day per week (with an average of three patients undergoing dental surgery) is devoted to this study. A project report is being submitted by Dr. Driscoll of NIDR.

4. Dr. Sandor Paskin with the assistance of Dr. Stephen Jackson, Dr. Ralph Epstein and Dr. John DeKernion (NCI) has set up a project to study the effects of methoxyflurane anesthesia upon the ability of the kidney to concentrate urine. Preoperative and postoperative renal function studies are performed on patients undergoing various types of surgery by NCI. A project report is attached.

5. Dr. Stephen H. Jackson, with the assistance of Dr. Ralph Epstein and Dr. Sandor Paskin, has initiated a study of the effects of anesthetic drugs on liver function *in vitro*. Cultures of rat liver cells are being subjected to various concentrations of anesthetic drugs. A project report is attached.

6. Dr. Ralph A. Epstein with the assistance of Dr. Stephen Jackson and in collaboration with Dr. S. Wyte and Dr. S. Sitter of Walter Reed Army Medical Center, has initiated a project to study the physiology and pharmacology of the neuromuscular refractory period in awake and anesthetized human beings. These studies are done in conjunction with major surgery carried on in the Clinical Center and at Walter Reed Medical Hospital. A project report is attached.

MAJOR PROBLEMS ENCOUNTERED

New problems were not encountered in FY 1968. Certain difficulties inherent in the operation of a Clinical Center professional service department, whose mission is to provide patient care services requested by the responsible Institute, were to be expected and were encountered. The tendency for work schedules to peak during certain periods did not permit the allocation of our personnel in the manner in which we would have preferred. However, by making certain adjustments we were able to overcome threatened personnel shortages.

The recruitment of trained personnel continued to require a disproportionate amount of time for the number of persons involved. The nature of the patient care activities of the Clinical Center, involving patients who are admitted with specific disease entities for specialized forms of treatment, precludes basic training programs for anesthetist personnel.

Personnel recruitment difficulties may be summarized as follows:

1. Each July we lose three physician anesthesiologists who have completed their obligated two years' service for the fulfillment of military commitments. Salary scales offered by the government do not enable us to retain men beyond the 2-year period of service. Through the utilization of PHS CORD Program, we are able to fill these vacancies with men who have been deferred during the period of their residency training.

2. Medical technicians. During the past year it was found impossible to recruit fully trained technicians capable of operating the pump oxygenator during open heart surgery, or to employ technical personnel with sufficient background to accept training in this speciality. Salaries offered under the current Civil Service scales which have been allocated to these positions were insufficient to attract new employees. Because of the failure to fill these essential positions, the extracorporeal apparatus specialitst positions were transferred from the Anesthesiology Department to the Nursing Department, CC, in order to permit a new approach to the problem.

3. Inhalation therapists were also in short supply. Here again, the salary scales which we were able to offer fail to attract qualified technicians from civilian hospitals. A concerted effort was made to upgrade our positions which resulted in the addition of a new and higher rating at the GS-6 level for a senior inhalation therapist. In an attempt to replace the Head of the Inhalation Therapy Section, following the death of the former incumbent, it was ascertained that the salary we were offering was at least 33% less than that obtainable in outside institutions.

CHANGES AND IMPROVEMENTS

Outstanding changes or improvements in the services provided by the Anesthesiology Department will be limited essentially to improvements in anesthetic techniques in patient care for Clinical Center patients, who as a whole constitute exceptionally high surgical risks.

FUTURE OBJECTIVES

Strengthening of our clinical and research programs by the addition of more career type personnel is the prime objective. It is to be hoped that changes in personnel policy and legislation may serve to attract additional anesthesiologists to remain at the Clinical Center after fulfilling their 2-year military obligation. In the interim, every effort will be made to continue to provide the best available anesthesiological care for the patients entrusted to us.

PUBLICATIONS

Striker, T. W., and Morrow, A. G.: Effect of succinylcholine on the level of serum potassium in man. Anesthesiology 29: 214-215, Jan.-Feb. 1968.

Serial No. CC-23
1. Anesthesiology Dept., CC
2. Anesthesia Research Lab.
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
July 1, 1967, through June 30, 1968

Project Title: The Human Neuromuscular Refractory Period

Previous Serial Number: None

Principal Investigator: R. A. Epstein, M.D.

Other Investigators: S. Jackson, M.D., S. Wyte, M.D., and S. Sitter, M.D.

Cooperating Units: U. S. Army (WRAMC)

Man Years

Total: 1.5
Professional: 1.5
Others: 0

Project Description:

Objective: To study the physiology and the pharmacology of the neuromuscular refractory period in awake and anesthetized humans.

Methods: The refractory period is determined by recording simultaneously the compound action potential and muscle tension evoked by stimulating a motor nerve with single or paired stimuli.

Major Findings:

a. The Block Aid Monitor$^{(R)}$ (a commonly used clinical nerve stimulator) causes paired stimulation.
b. Non-depolarizing muscle relaxants decrease the refractory period.
c. Anticholinesterases increase the refractory period.
d. Tetanic stimulation increases the refractory period.
e. Halothane increases the refractory period.

Significance to Biomedical Research and Clinical Practice:
a. Providing basic information concerning the nature of neuromuscular transmission.
b. Contributing to the general theory concerning the interaction of relaxant drugs and anesthesia.
c. Determining the proper parameters for nerve stimulation under clinical conditions.
d. Developing a sensitive test for the presence of curare in humans.

Proposed Course:
a. Investigation of the neuromuscular effect of depolarizing drugs.
b. Possibly investigating the myasthenic lesion.

Publications: None

Serial No. CC-23
1. Anesthesiology Dept., CC
2. Anesthesia Research Lab.
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
July 1, 1967, through June 30, 1968

Project Title: The Effect of Anesthetic Drugs on Liver Function in Vitro

Previous Serial Number: None

Principal Investigator: Stephen H. Jackson, M.D.

Other Investigators: Ralph Epstein, M.D., and Sandor Paskin, M.D.

Cooperating Units: None

Man Years

Total: 0.5
Professional: 0.5
Others: 0

Project Description:

Objective: To determine the effect of clinically useful anesthetic drugs on hepatic function *in vitro*.

Methods: Rat hepatoma liver cells are grown in monolayer and in suspension. Optimal environmental conditions are established for logarithmic cellular growth. Through originally designed glass vaporizers and humidifiers, precise concentrations of various sterile anesthetic gases are delivered to hepatic cells suspended via a gyrotatory water bath shaker. Growth curves are constructed.

Major Findings: Statistically significant results have not yet been obtained.

Significance to Biomedical Research and Clinical Practice: The unique physical design of this experiment may be utilized in the future for experiments with cell suspensions from other organs. The anticipated *in vitro* results of this experiment should influence interpretation of *in* vivo studies.

Proposed Course: Completed experiments within twelve months.

Publications: Publication of results is planned.

Serial No. CC-23
1. Anesthesiology Dept., CC
2. Anesthesia Research Lab.
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
July 1, 1967, through June 30, 1968

Project Title:	The Effect of Methoxyflurane Anesthesia on the Ability of the Kidney to Concentrate Urine
Previous Serial Number:	None
Principal Investigator:	S. Paskin, M.D.
Other Investigators:	S. Jackson, M.D., J. DeKernion, M.D., R. Epstein, M.D.
Cooperating Units:	National Cancer Institute, Surgical Branch Clinical Pathology Department

Man Years

Total:	0.1
Professional:	0.1
Others:	0

Project Description:

Objectives:	To detect any possible abnormality in the ability of the kidney to concentrate urine after the administration of methoxyflurane anesthesia.
Methods Employed:	Pre-and postoperative renal function studies are performed in order to detect any abnormality that might result from the administration of methoxyflurane. Each patient serves as his own control.
Major Findings:	None at present
Significance to Biomedical Research and Clinical Practice:	Methoxyflurane is one of the major anesthetics in use today. Any findings as to its effect on kidney function would be of clinical significance in the selection of anesthetic techniques for patients with kidney disease.

Proposed Course:	Completion of project is expected in the next 12 months.
Publications:	Publication of the results as well as clinical implications will follow.

Serial No. CC-23
1. Anesthesiology Dept., CC
2. Anesthesia Research Lab.
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
July 1, 1967, through June 30, 1968

Project Title: Pulmonary Alveolar Surface Tension in Particulate Pulmonary Embolism

Previous Serial Number: None

Principal Investigator: Philip E. G. Mann, M.D.

Other Investigators: None

Cooperating Units: National Heart Institute

Man Years

Total: 0.7
Professional: 0.7
Others: 0.0

Project Description:

Objective: To elucidate the relation of diminished surfactant activity in the lung lining to pulmonary embolism experimentally produced.

Methods: Pulmonary embolism is produced by standard techniques with glass and spore emboli of varying size. After a suitable interval the experimental animal is sacrificed and pulmonary surface tension determined by a modification of the standard technique of R. E. Pattle (Bubble method).

Major Findings: A significantly diminished surface activity as measured by the bubble stability technique was demonstrated in lungs embolized by both 100 and 28 micron diameter particles. Three possible mechanisms may be involved:

1. Ischemia of the lung parenchyma combined with oxygen deprivation due to occlusion of the air-containing units involved.
2. A physical influence of blood on the surface activity material giving rise to findings usually associated with reduced surface activity.

	3. Local tissue pH change resulting from continued ventilation of unperfused tissue areas.
Significance to Biomedical Research and Clinical Practice:	Particulate embolism of small pulmonary vessels, as for instance, during cardiopulmonary bypass, may affect function of local lung areas, through alteration of alveolar stability.
Proposed Course:	Project complete.
Publication:	Publication in preparation.

Serial No. CC-23
1. Anesthesiology Dept., CC
2. Anesthesia Research Lab.
3. Bethesda, Maryland

PHS-NIH
Individual Project Report
July 1, 1967, through June 30, 1968

Project Title:	Pulmonary Alveolar Surface Tension Following Administration of Protamine
Previous Serial Number:	None
Principal Investigator:	P. Mann, M.D.
Other Investigators:	None
Cooperating Units:	National Heart Institute
Man Years	
Total:	0.3
Professional:	0.3
Others:	0
Project Description:	
Objective:	To evaluate the effects of Protamine on alveolar surface tension in the rabbit.
Methods:	A modification of the technique of R. E. Pattle, a method designed to evaluate pulmonary alveolar surface activity through the observation of dimensional changes in bubbles expressed from small volumes of pulmonary parenchyma, was employed.
Major Findings:	The surface tension methods employed suggest a significant effect in clinical dosage ranges.
Significance to Biomedical Research and Clinical Practice:	Protamine may play a role in pulmonary malfunction following cardiopulmonary bypass.
Proposed Course:	Project in progress.
Publication:	Publication is planned.

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

BLOOD BANK DEPARTMENT

CC-24
Serial No.

TABLE OF CONTENTS

Summary of Service and Developmental Accomplishments BB-1

- Better Blood Utilization BB-1
- Work Effort BB-2

Contributions to Collaborative Research BB-2

- Mechanism of Acute Renal Failure BB-2
- Accuracy of Laboratory Examinations BB-2
- Blood Groups and Disease BB-3

Problems, Changes and Improvements BB-3

- Plant Alterations BB-3
- Automated Blood Separation BB-3
- Hepatitis Surveillance BB-3

Training BB-4

- Medical Technologists BB-4
- Clinical Associates BB-4

Professional Staff BB-4

Future Plans BB-5

Publications BB-6

Tables BB-7

1. Blood and Blood Components BB-7
2. Work Units BB-8

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

BLOOD BANK DEPARTMENT

CC-24
Serial No.

SUMMARY OF SERVICE AND DEVELOPMENTAL ACCOMPLISHMENTS

Better Blood Utilization

A trend can be seen in the accomplishments of the Clinical Center Blood Bank in its better blood utilization which works to the benefit not only of patients in the Clinical Center but also in the medical community at large. In the past we found it necessary to bring in large quantities of whole blood and process it in order to extract the fresh blood components needed by Clinical Center patients. This reached a peak last year when for a utilization of 20,962 transfusion units (blood or components, each extracted from one pint of blood) our accession was 16,308 units (utilization rate 128%).

This year we find that the processing methods developed here are being employed by our suppliers so that one donated unit (pint) can serve not only several patients at this hospital but at several hospitals. One quarter of our accession no longer represents whole blood but rather the specific component that we need, leaving the other components for use in some other hospital in the community. The most striking example of this was 2,096 units of platelet-poor, fresh-frozen plasma obtained as a by-product of the platelet transfusion program at the Baltimore Public Health Service Hospital. We used this material to make antihemophilic cryoprecipitate by a method we reported this year. The antihemophilic material was used for Clinical Center patients; this batch had a commercial value of over $50,000. Although antihemophilic cryoprecipitate was only introduced as a therapeutic product in 1966, almost 5,000 units were transfused this year at the Clinical Center.

Because of this community exchange program, although our utilization this year increased slightly to 22,637 units of blood and its components, our accession also climbed to 19,896 units. However, of the 19,896 units, 5,790 were components utilized unit out for unit in: 3,694 platelet concentrates (from which the red cells and the antihemophilic materials remained in the outside medical community) and 2,096 units of the antihemophilic plasma by-product from the Baltimore hospital. The remaining 16,847 of our transfusions were given from a whole blood accession of 14,106. This makes for a corrected utilization rate of 119%. The uncorrected figures are shown in Table 1 for comparability with past reporting. The continuing trend for utilization of blood components instead of whole blood is clear.

Work Effort

With the ability to obtain from outside sources the needed blood components instead of whole blood, a certain unusual set of events can be demonstrated by work effort figures. These figures have been used in the past to show the work effort (as a time unit--work units/technologist/day) for the immunohematology laboratory technologist staff. As can be expected, with more preprocessed blood coming in it has been possible to work in the laboratory at a more realistic and planned pace (Table 2). It has been possible to bring the work rate down toward a safer level of 70 work units/technologist/day (optimal 60).

In order to keep the large volumes of blood components flowing, more and more work has been performed by the professional nursing staff, for whom a work unit figure has not been derived. In addition, these nurses also carry a large load in obtaining blood samples for laboratory experimental use by investigators in all the Institutes. Nursing activity is not shown in the figures in Table 2. Serious staffing problems have arisen in the nursing area.

CONTRIBUTIONS TO COLLABORATIVE RESEARCH

Mechanism of Acute Renal Failure

A study was completed which definitely describes the mechanism of the acute renal failure associated with incompatible transfusion. The syndrome was described 300 years ago and blocked interest in the revival of transfusion 100 years ago. The blood group incompatibility which leads to the syndrome was described by Landsteiner 50 years ago. Despite this history and several hundreds of experimental studies which have been made, the mechanism of the damage was never shown. Studies were made in this department in collaborative work on a related project for NIAMD and then proved in experimental work done with NIAID. The definitive report was made this year, firmly establishing the cause for this dread consequence of transfusion. We proved that the antigen-antibody complex, and not the intravascular liberation of hemoglobin and clotting factors, causes the problem. This finding is basic to effective treatment of the syndrome. It provides new guidelines for research in kidney disease and transplantation.

Accuracy of Laboratory Examinations

The accuracy of the laboratory examinations on blood which are made before transfusion was exposed to continuing analysis. Attention this year was given to a previously undescribed form of an Rh antibody (rh^{w1}) in a patient in an immunological-stress situation. The clinical picture in this patient served as a model for a review of transfusion practices. The detection of the incompatibility and the trial of various test situations, including *in vivo* tests, were reported as a working model for such searches in other laboratories. The resultant improvements in technique were incorporated into laboratory practice at the Clinical Center as a step toward guaranteeing greater safety in patient care.

Blood Groups and Disease

The active relationship between blood groups and disease was demonstrated in several studies. Particular emphasis was given to infectious diseases and drug therapy. The most significant contribution, in collaboration with NIAID, developed the concept of the attack on the red cell membrane by the pleuropneumonia-like organisms. Mycoplasma pneumonia, the etiologic agent of primary atypical pneumonia is one of the greatest causes of "lost time" in military recruit populations. The pneumonia is often associated with a hemolytic anemia. We reported the direct demonstration of the etiologic link between the organism and the resultant anemia. The finding is basic to the concept of autoimmunity since the link was the exposure of "non-self" antigens on the red cells in vivo.

PROBLEMS, CHANGES AND IMPROVEMENTS

Plant Alterations

Plant alterations in several work areas were made to expedite work flow. In the blood donor area a separation was made of the several varieties of donor traffic: those donors giving small test blood samples; those for regular and experimental phlebotomy; and patients. The design also allowed physical separation of waiting from recuperating donors. The area which had been on loan to the Clinical Pathology Department for use in glassware washing was converted into a centrifuge room for both standard and experimental machines.

Automated Blood Separation

Continuing perfection of hand methods for preparing blood components for transfusion was accomplished. The antihemophilic cryoprecipitate method was polished so that over 50 units per hour could be prepared from previously frozen plasma. The more fragile platelet concentrates still require more time-consuming handling. Expediting these preparations will require semi-automated or automated blood separation processes and several available centrifuges are under trial in the laboratory area for potential application.

Hepatitis Surveillance

We have stepped up our hepatitis surveillance of patients posttransfusion to establish the incidence of the anicteric (mild) form of the disease in comparison with our data on the icteric (severe) form. Because our blood supplies come from several parts of the country, we are establishing epidemiologic proof for differing rates of prevalence of hepatitis carriers among different donor populations. In addition, we hope to establish whether the unknown incidence of chronic liver disease bears a relationship to whether the initial episode is mild or severe. To date, these studies supply only information on the magnitude of the problem but they will permit expeditious prospective study of proposed prophylaxis and treatment. The mass production of blood components is beginning to face one of the problems that caused disillusionment with the older blood fractions, i.e., hepatitis. We have

not been using Pooled Plasma (Human) for some years because of our assessment of the hepatitis hazard. A March 1968 statement by the National Research Council has confirmed our caution--they issued a nationwide warning about Pooled Plasma (Human). Now as we begin pooling Platelet Rich Plasma in order to obtain the large masses of platelet concentrates we need, we approach the infectivity potential from other pooled blood products.

TRAINING

Two major training efforts are continuing, both aimed at alleviating the shortage of specialized professional personnel.

Medical Technologists

All medical technologists are given an 18-month on-the-job practical and didactic course in a formal program jointly with the American Society of Clinical Pathologists. This is an advanced program for those who already have the baccalaureate degree in medical technology. Currently three of our employees are in this program.

Clinical Associates

Clinical Associates are under an intensive two year preceptorship in this department for training and experience in the service and research aspects of immunohematology and transfusion practice. There is an immediate need for physicians who can assume a responsibility for blood and blood component therapy at research, university, and regional medical centers. Five of the physicians who have gone through this program have such appointments and two more are currently in the preceptorship.

PROFESSIONAL STAFF

Dr. Paul V. Holland completed his assignment for training in clinical hematology at the San Francisco Medical Center in June 1968. He is returning to the Clinical Center to assume responsibility for clinical immunohematology.

Dr. Alfred J. Grindon, who has been Assistant to the Chief for the past year, completed two years of service on June 29, 1968. He has accepted an appointment at St. Louis University as Assistant Professor of Medicine and Assistant Professor of Pathology. He will be Director of Blood Bank, Snodgress Memorial Laboratory at St. Louis City Hospital.

Dr. William V. Miller was appointed to the staff on July 1, 1967. After one year of responsibility for the blood donor activities, he will be assuming Dr. Grindon's responsibility in laboratory immunohematology on July 1, 1968.

Since July 1967, Dr. John H. Walsh has been on assignment to this department from the National Communicable Disease Center. He was assigned specifically as an Epidemic Intelligence Service Officer to consider the problem of post-transfusion hepatitis. This recognition by the NCDC of the unique study potential available here has made possible the intensive investigations already done and those planned for FY 1969.

Dr. Linley E. Watson will be appointed to the staff on July 1, 1968. He has interest and experience in the application of computer techniques to medicine.

FUTURE PLANS

Our immediate, continuing and overriding objective will be to supply pure, safe and potent blood products for the advanced transfusion practice required in the Clinical Center.

The methods actually under trial in this department for utilizing machines for harvesting blood components will be brought to clinical application. This is contingent on our finding them safe and effective by in vitro trial. Several different machines were made available in the last few months of FY 1968 and our goal is to find the best features of each, working as a nonpartisan group interested in practical application only.

With a physician on the staff with experience in computer applications, we are ready to make reasoned and refined evaluation of practical automated systems for laboratory test and data processing.

Our epidemiologic surveillance of posttransfusion hepatitis will have established risk factors for various blood components by source. We are ready to apply these data to evaluation of specific prophylactic situations, e.g., interferon induction, washing red cells for combination with sterilized plasma fractions, vaccines, etc. We must maintain the epidemiology test structure to be ready to move into clinical trial of any really promising approach to reduce the incidence of the disease.

The real relations between immunohematology and human biology will continue to be explored. The red cell surface is becoming visible in the detail that will permit application of electron microscopy to immunohematology. Our access to rare red cells and their antibodies from our clinical practice makes the use of the electron microscope in immunology a real prospect.

PUBLICATIONS

Cooke, J.V., Holland, P.V., and Shulman, N.R.: Cryoprecipitate concentrates of factor VIII for surgery in hemophiliacs. Ann. Intern. Med. 68: 39-47, Jan. 1968.

Chessin, L.N., and McGinniss, M.H.: Further evidence for the serologic association of the O (H) and I blood groups. Vox Sang. 14: 194-201, 1968.

Gralnick, H.R., and McGinniss, M.H.: Immune cross-reactivity of penicillin and cephalothin. Nature 216: 1026-1027, Dec. 1967.

Grindon, A.J., Holland, P.V., and Schmidt, P.J.: Posttransfusion hepatitis. Amer. Heart J. 74: 591-594, Nov. 1967.

Holland, P.V., Menken, M., and Berlin, N.I.: Autoimmune hemolytic anemia, acute leukemia, and carcinoma of the lung. Arch. Intern. Med. (Chicago) 120: 341-344, Sept. 1967.

McGinniss, M.H., Kaplan, H.S., Bowen, A.B., and Schmidt, P.J.: Agglutinins for "null" red cells. Transfusion. 1968. In press.

Myrianthopoulos, N., and Leyshon, W.C.: The relation of blood groups and the secretor factor to amyothrophic lateral sclerosis. Amer. J. Hum. Genet. 19: 607-616, Sept. 1967.

Schmidt, P.J., and Grindon, A.J.: Blood and blood components in the prevention and control of bleeding. JAMA 202: 967-969, Dec. 1967.

Schmidt, P.J., and Holland, P.V.: Pathogenesis of the acute renal feilure associated with incompatible transfusion. Lancet 2: 1169-1172, Dec. 1967.

Schmidt, P.J., Holland, P.V., Lostumbo, M.M., Moss, K.I., and Sobota, J.T.: Hemoglobinuria due to anti-rh^{w}1(C^{w}): Observations on enzyme test procedures. Amer. J. Clin. Path. 49: 467-471, Apr. 1968.

Schmidt, P.J., and McGinniss, M.H.: Cell surfaces, blood groups and microorganisms. Nature 214: 1363, Jun. 1967.

Schmidt, P.J., and Vos, G.H.: Multiple phenotypic abnormalities associated with Rh$_{null}$(---/---). Vox Sang. 13: 18-20, 1967.

Smith, C.B., McGinniss, M.H., and Schmidt, P.J.: Changes in erythrocyte I agglutinogen and anti-I agglutinins during Mycoplasma Pneumoniae infection in man. J. Immun. 99: 333-339, 1967.

Table 1. Blood and Blood Components

Utilization in Units*

	July-Dec. 1965	Jan.-June 1966	July-Dec. 1966	Jan.-June 1967	July-Dec. 1967	Jan.-June** 1968
Net Accession	9,757	9,565	7,747	8,561	8,401	11,495
Transfusions						
Whole Blood	3,309	2,742	2,509	2,613	2,080	1,716
Components	6,947	8,072	7,022	8,818	8,721	10,120
Total	10,256	10,814	9,531	11,431	10,801	11,836
Utilization (%)	105	113	123	133	128	103

---

*A unit may represent either a pint of whole blood or all of a particular blood component derived from one pint of blood.

**Figures for second half of FY 1968 are estimated on basis of first 4 months.

Table 2. Work Units*

	July-Dec. 1965	Jan.-June 1966	July-Dec. 1966	Jan.-June 1967	July-Dec. 1967	Jan.-June** 1968
Total work units	61,175	59,704	60,345	65,709	60,820	61,951
Mean work units/ technologist/day	69	71	77	83	75	70

*A work unit is a time-based test unit.

**Figures for second half of FY 1968 are estimated on basis of first 4 months.

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

CLINICAL PATHOLOGY DEPARTMENT

CC-37
Serial No.

TABLE OF CONTENTS

Summary CP-1
Objectives CP-2
Achievements CP-3
  Clinical Chemistry Service CP-3
  Hematology Service CP-8
  Infections Laboratory Services CP-11
  Research, Development and Laboratory Automation Section CP-17
Staffing ....
  Chemistry .... CP- 6
  Hematology CP-11
  Infections Laboratory Services CP-16
  Research, Development and Laboratory Automation Section CP-20
  Office of the Chief CP-22
    Appointments, Resignations and Transfers CP-22
    Awards and Honors CP-22
Proposed Course and Future Plans CP-23
Publications CP-26
Tables CP-30
  1. Average Monthly Work Load Statistics for the CPD, FY 1968 .... CP-30
  2. List of Formal Training Courses Completed by Staff, FY 1968 .. CP-31

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

CLINICAL PATHOLOGY DEPARTMENT

CC-37
Serial No.

SUMMARY

Advances in medical knowledge, applicable related sciences, and technology have produced a growing demand for many additional sophisticated tests. Recognition of the value of admission profile screens and evaluation of response to therapy continuously stimulates the demand for more tests which has caused another annual increment of 12% in service work load (1967). In spite of improved efficiency of automation, semiautomation and computer processing of data and generation of work lists, patient directories and reports, the service load on the professional staff and lack of space and technical assistance has curtailed most of the research of Service Chiefs and senior staff.

The primary objectives of 1) improved patient care service through application of new scientific knowledge and the best modern laboratory technology, and 2) development of a model automated laboratory have been pursued while maintaining progress in the equally important missions of education and research in laboratory medicine.

One important research problem which is pertinent to both quality assurance of laboratory methods and interpretive significance of results is our study of the laboratory test profile of normal individuals which has been continued in collaboration with Dr. Eugene Harris (DCRT). The findings demonstrate a characteristic individuality of these chemical profiles and reveal a critical physiological control of these chemical constituents which is quite beyond the current degree of resolution of most laboratory test procedures. These results emphasize the requirement for more sensitive, accurate and reliable methods and the importance of serial determination of such profiles in evaluating the normal or abnormal state of an individual's physiology and his response to disease and treatment. Progress in development of automated instrumentation of analyses and computer programs has resulted in automated or semiautomated processing of approximately 60% of the routine test load in clinical chemistry and 75% in hematology. This enabled us to absorb an 18% increase in work load in chemistry with fewer technical staff (11% reduction due to unfilled vacancies) and yet provide reports to physicians earlier than before. All laboratory results for chemistry and hematology including manual tests are entered into the computer and all work lists and reports are processed and printed, the data being permanently stored. Programs are completed and ready for providing prototype chronological summary reports periodically for physicians as soon as an additional computer operator can be employed and trained. Analysis of operating needs and design of a data input and processing system for the Infections Laboratory are in progress and will be instituted next year.

A number of improved and new methods have been established in all three services.

The mainstream of laboratory medicine today is characterized by an upheaval in the pattern of private practice of pathologists in hospital and independent laboratories due to the entry of industry into this field, the awakening of great university medical schools to recognize their traditional neglect of clinical pathology, the growing important role of the laboratory in medicine, and a public clamor for higher quality and lower cost laboratory services, particularly stimulated by expanding nationwide health and medical care programs. In this environment the National Institutes of Health must assume leadership in providing a model of modern laboratory medicine for guidance of medical schools, medical centers, and regional medical programs. Although we still are far from being an adequate model, we have the most advanced system of laboratory automation and computer processing currently in operation for daily patient care. However, limitations in space and staff have forced our department to send specimens for many tests to commercial laboratories at considerable expense to the Government without the standards of quality assurance which we are able to provide for tests performed within the Clinical Pathology Department. We must expand the variety of procedures which can be performed in our laboratory to equal or surpass the wide selections of routine tests which are available in clinical laboratories of other advanced medical centers. Ideally we should be able to provide any diagnostic laboratory support needed by our patient care physicians. Our plans for the future must provide expansion of our professional competence in the fields of enzymology, hormones, toxicology, steroids, metabolic chemistry, trace metals, immunochemistry and ultramicro methodology. We should become a consultation center and model of comprehensive and quality assured test performance as well as automation and computer processing. Our senior staff should be sufficient not only to continue research and development in automation, but also to provide expertise in the important specialized areas of physiological chemistry, functional hematology and applied microbiology, to maintain opportunity for personal research, and to fulfill the obligations of consultative assistance to medical schools and other medical centers in the design, organization, staffing, automation and management of clinical laboratory departments.

OBJECTIVES

Within the general objectives of highest quality laboratory service, development of effective and efficient automation, training and research, there are certain aspects which require particular emphasis and expansion.

There is a wide gap of 10-20 years between the research acquisition of new scientific and medical knowledge and development of technical advances and the practical application of such knowledge and techniques to every day patient care and health maintenance. Most new research methods are too slow, cumbersome, or expensive in effort and materials for every day and high volume use. The task of modification, simplification, improving reliability, adaptation and application of research methods to everyday use is tedious, difficult, expensive and commonly regarded as not particularly exciting. This type of development is not often rewarded with material for publication or recognition and yet it is mandatory if the public is to benefit from research progress.

This activity should be recognized for its importance and effort in this area should be substantially expanded in our department which will require additional competent professional staff and additional space.

Computer assisted automation and correlative data processing and reporting must be modified and expanded to provide methods, programs and modular instrumentation which are applicable to the requirements of other medical centers and smaller hospitals as well as to the Clinical Center. Our present system is the most advanced and comprehensive in existence to date and although it meets our particular needs, it is too large and expensive for manv smaller hospitals. The now obvious direction of development of most efficient and flexible processing systems in medical laboratories (and other patient care operations as well) and direction of industrial development are toward modular design of several small, fast computers with on-line connection to groups of related automated assay instruments. Such a decentralized system also provides built-in capability for exchangeable back-up in case of failure of individual components, and local back-up for failures in the main computer system.

Training programs and facilities should be expanded to permit larger numbers of residents to gain qualification in our department and to provide post-residency specialization in clinical chemistry, hematology, immunohematology, medical microbiology, clinical virology, automation and computer processing of laboratory data and laboratory management. There is a rapidly growing need for qualified clinical pathologists and particularly for experts in these special fields of clinical pathology in academic institutions and the many centers which must provide laboratory medicine for the new regional medical programs. There exist very few places in this country where such training is available. Of the 90 medical schools, only 7 or 8 provide this type and level of training.

If we are to maintain the caliber of professional staff (clinical pathologists and internists) required to carry out these objectives in the face of substantially lower financial compensation compared even to academic institutions, we must provide attractive opportunities for professional growth; this is, independent research, association and communication with stimulating peers at professional meetings, symposia, etc., and periods of advanced education in their special fields at appropriate advanced institutions here or overseas.

ACHIEVEMENTS

Clinical Chemistry Service

A greater workload without a corresponding increase in staff resulted in a considerable increase in work per technologist. Further automation of procedures performed in the routine laboratory reduced some of the impact of the greater workload. The implementation of on-line entry of test results by remote keyboard consoles coupled to a laboratory data-collector permitted a reduction of manual effort and tedium in marking result cards, so that only those tests which produce many results from a single request e.g., urinalysis tests or protein electrophoresis need be entered to the computer by mark-sense result cards. The consoles have the additional capability of permitting results to be sent to the computer while other results are still being generated, obviating the delays in batch processing of cards only after all tests have been completed. Improved efficiency was thereby gained. Results have also been entered onto a data tape at night and during weekends to lessen the quantity of data to be entered manually during the busiest times of laboratory operation.

LDH isoenzyme analysis was introduced as a routine procedure to supplement the previously available enzyme analyses used in the diagnosis and investigation of heart and liver disease and blood dyscrasias. Novel methods of calibrating automatic analytical equipment were instituted to eliminate errors due to variation in aspiration of sample. These techniques have been fully evaluated for incorporation into the on-line analytical systems. Much of the automated equipment has been modified to permit more reproducible and accurate results than are obtainable using standard components.

A system of monitoring the concentration of solutions has been instituted which allows continual study of standard solutions for routine laboratory procedures. Some of the equipment for this was developed in conjunction with BEIB. Collaboration with the National Communicable Disease Center and other organizations has enabled the benefits of the high standards of quality control used in this laboratory to be utilized in other hospitals throughout the country. Collaboration with the Department of Nuclear Medicine has been undertaken to improve the quality of analyses using radioactive materials.

The methods used to perform many analyses were changed and others were considerably modified. For example, the procedures for total and direct bilirubin, phosphate, urea nitrogen, alkaline phosphatase, gastric acidity and protein electrophoresis were altered and work was begun to improve the uric acid, creatinine, alpha amino nitrogen, salicylate and electrolyte procedures. It is necessary to repeatedly reexamine the analytical methods in use and a policy of continual updating has been embarked upon to ensure that the best quality of test performance is available to physicians.

Further development of the Enzyme Assay System was undertaken to improve the reproducibility of results, and it is unlikely that any commercially available equipment will achieve an equivalent degree of accuracy using the kinetic assay method for some years. Improved pipetting and mixing of solutions has been achieved and computer programs are being rewritten to permit greater resolution of results. Modifications to the carrier-racks and the use of smaller tubes for blood collection have permitted the use of heparinized samples for electrolyte analysis. Modifications in the flame photometer have been initiated to permit more rapid and efficient processing of the samples.

The benefits of computer processing of data were seen in the daily printout of data on laboratory controls. Lists of results which fall outside predetermined limits, frequency distributions of all results with means and standard deviations, and a daily updating of control results, permit rapid evaluation of the quality of our laboratory data. This allows changes in procedure or solutions to correct for abnormal conditions to be made much earlier than had been possible before.

As part of the Service's responsibility to provide the optimum quality of results the professional staff actively evaluates new equipment as it becomes available. In this respect, apparatus for thin-layer electrophoresis of plasma proteins, and isoenzymes and lipoproteins underwent intensive study. Fluorometric techniques for enzymes were evaluated on several different instruments and it was found that the quality of equipment available is the limiting factor to introducing new enzyme analyses on ultramicro quantities of sample. New pipetting equipment is continually evaluated with a view to improving reproducibility and accuracy. As far as possible, all new equipment is studied under simulated routine conditions before it is purchased or used in the routine laboratory.

The introduction of disposable containers and a novel system for urine preservation resulted in improved hygiene and greater efficiency in handling samples. Chromatographic techniques have been developed, and are available on a consultative basis, for the study in depth of many different classes of urinary constituents, e.g. carbohydrates, porphyrins, indolic and phenolic acids.

Service Productivity: The Chemistry Service processed an average of 39,400 work units per month. This was an increase of 18% over the previous year. In 1964, in the ultramicro laboratory one technologist could perform all the workload of a week in 4 hours. This year two full time technologists are barely able to accomplish the increased load in 40 hours, an increase of 10 fold in 3 years. It should be noted that while the patient census has remained constant from 1964 to 1967 the total workload, measured in terms of work units has increased by 47%. Without an increase in numbers of technical staff to process this workload, there is a continual struggle to maintain the high quality of data for which the Clinical Pathology Department is renowned.

No amount of automated analytical or data processing equipment can compensate for poor technical skills in the laboratory. Continued training, lectures and close supervision are necessary to maintain high standards of technical proficiency. It is estimated that at least 9 months experience and training are required for a newly employed technologist to become proficient in all areas of the chemistry laboratory. More than 50% of the technical staff currently performing routine tests have been employed for less than one year. This high turnover is due to Civil Service pay scales which do not equal those outside. The group leaders of 6 of our 8 work groups have had less than one year of supervisory experience. Nevertheless, careful selection of job applicants plus the thorough and comprehensive training given to each technologist in the Chemistry Service have enabled us to continue providing the high quality data expected of us for patient care. In the long run, however, we cannot but suffer from the necessary restraints these considerations have placed on the introduction of new procedures and modifications of existing methodologies.

Collaborative Contributions: Dr. Donald Young has worked intensively with T. W. Mears of the National Bureau of Standards on the development and use of highly purified chemicals as standard materials for Clinical Chemistry.

Dr. Donald Young and Dr. John Peterson (BEIB) continued their collaboration on instrumental design for automated urine analyses. Equipment is at present being evaluated for the automatic separation of urine deposit and preparation of filtrate for chemical analyses. Development of new techniques for urine preservation and urine volume measurement has also been undertaken.

Dr. Michael Cantz, Visiting Scientist, has worked with Dr. Young on the measurement of urinary electrolytes and chromatographic techniques for detecting abnormal urinary constituents.

Dr. George Weiss (DCRT) and Dr. Young have continued to investigate problems of interaction of analytical instruments and the computer.

Dr. G. Z. Williams, Dr. E. Cotlove, Dr. Young and Dr. Eugene Harris (DCRT) have continued the study of the variation of biochemical parameters in normal subjects.

Dr. J. T. Wilson has collaborated with Dr. T. Minas (NINDB) in the development of electrophoretic techniques for LDH isoenzymes and the investigation of abnormal isoenzyme patterns in ophthalmological disease.

Dr. Howard Sussman continued his studies of human alkaline phosphatase. He demonstrated the usefulness of isoenzyme patterns of alkaline phosphatase in distinguishing between normal and abnormal pregnancy. He also demonstrated the unexpected finding that the elevated serum alkaline phosphatase in Paget's disease is mainly of hepatic rather than osseous origin. At a basic biochemical level he has also determined the primary and quaternary structure of human placental alkaline phosphatase.

Dr. Emil Laga has collaborated with Dr. Sussman on the characteristics of the mechanism of action of alkaline phosphatase and its role in phosphoryl transfer, using synthetic phosphates, inorganic pyrophosphate and organic phosphate as substrates. Dr. Laga also investigated the kinetic and thermodynamic parameters of the phosphohydrolase and phosphotransferase activities of the enzyme.

Mr. H. H. Nishi has worked with engineers of BEIB in improving the precision of automated equipment and the development of automated analytical equipment for ultramicro procedures.

Staffing: Dr. Joseph T. Wilson, Assistant Chief, Clinical Chemistry Service.

Dr. Michael J. Cantz, Visiting Scientist, Clinical Chemistry Service.

Examples of Contribution to Patient Care: During etiologic studies for dwarfism, a 6-year-old patient received an infusion of arginine hydrochloride for assessment of growth hormone production. During the infusion, the patient suddenly became comatose. Known insulinogenic effects of arginine HCl led the physician immediately to administer 50% glucose intravenously and send blood samples for control analyses. Initial results revealed a moderately severe hyperchloremic acidosis and hyperglycemia. Since this degree of acidosis was insufficient to account for the clinical picture, we suspected the possibility of hyperosmolar coma and measured a markedly elevated serum osmolality. These laboratory findings and interpretations led to the institution of appropriate therapy and subsequent recovery of the patient. Further studies of the serum and urine electrolyte patterns during recovery afforded a more complete understanding of the pathogenesis of the complex acid-base electrolyte disturbances in this patient, which included a metabolic acidosis, a serum electrolyte "cation gap", and severe hyperosmolarity.

A 40-year-old woman was under study for hyperuricemia and metabolic alkalosis. We noted a severe hypomagnesemia as an incidental finding. Because low magnesium levels frequently cause convulsions, consultation from the Clinical Chemistry Service was requested in relation to specific replacement therapy. The magnesium level was restored to normal and the patient was discharged in good condition.

During the development of techniques for systematic study of urinary constituents the urine from a patient with progeria (premature aging) was studied. This revealed an unexpected abnormality of carbohydrate metabolism which may lead to a better undertanding of the metabolic abnormalities associated with this perplexing disease.

Developmental Research and Future Plans: The major research effort in this Service is directed towards the improvement of accuracy and reliability of analyses. Current efforts involve performing many of the high volume test procedures in the laboratory at a rate of 90 to 120 samples per hour without diminution in the accuracy of results. This involves careful evaluation of the characteristics of the analytical instrumentation to incorporate modifications to ensure greater reproducibility at the higher rates of analysis.

The investigation of new enzymatic assays will be extended to provide more organ specificity for the investigation of disease and monitoring of treatment. Improved techniques, notably fluorescence, will be introduced to reduce the required volume of sample and to increase the sensitivity of the method. The accuracy of ammonia analyses has been shown to be improved by fluorimetric technique which will be developed to a point at which it can be incorporated into routine operation. Discussions have already taken place with several manufacturers of new sophisticated equipment capable of performing multiple analyses simultaneously at rates up to 60 samples per hour, or one or two analyses at a rate of 120 samples per hour, and plans are being made to evaluate the more promising of these instruments under routine operating conditions.

The number of test procedures available for the examination of urine is being continually increased. Improvement in their accuracy also is being achieved. New tests including chromatographic analyses of groups of compounds have been developed and are in use on a pilot basis. This will be expanded to be available on a consultative basis. In cooperation with the staff of the Molecular Anatomy Program of the Oak Ridge National Laboratories, highly sophisticated equipment will be used to study the composition of urine with a view to the development of new diagnostic tests for systemic diseases.

The role of the computer in monitoring laboratory data will be expanded by connecting more instruments on-line and permitting the computer to perform calculations at present performed manually. Expanded use of remote entry consoles to enter directories matching accession number and position of sample will enable many different analytical instruments to be coupled to the computer through a "buffered" system. Data feedback will be used to monitor the quality of analyses.

The immediate targets in the laboratory are to further improve accuracy of results, enhance efficiency, and expand the variety of procedures which can be performed in the laboratory. Several tests which are performed currently under contract by outside laboratories, will be reviewed for feasibility of performance within the Clinical Chemistry Service. This would ensure better accuracy of results using methods of quality assurance used in conjunction with the Clinical Pathology Department computer system. We are endeavoring to provide specialized diagnostic tests, not routinely performed, on a consultative basis to patient-care physicians to facilitate the study of obscure diagnostic problems.

Hematology

Patient Care Services: Continuing efforts directed toward efficient utilization of available automation and computer assistance has resulted in consistently sending completed Hematology results to the patient floors before 2:00 p.m. Similarly, scheduling of alternating blood collection periods and specimen analysis periods has increased the efficiency of the AFU laboratory and has accelerated the reporting of results to outpatient physicians.

Increased quality control procedures of replicate sample analysis and a systematic, frequent standardization of the analytical instruments has improved precision and accuracy of test results.

Several new diagnostic procedures described below were instituted in subdivisions of the Hematology Service: these procedures have been useful for the management of patients throughout the hospital but particularly those of the NCI, NHI and NIAID.

Requests for consultation services have increased and include both consultations on individual patients and weekly morphology rounds with groups of patient-care physicians.

Service Productivity: Daily operation under a continuing program for intralaboratory efficiency and utilization of the on-line data entry system has permitted work productivity at a rate of about 150 work units/technologist/day during the four hour period from 8:30 a.m. to 12:30 p.m. The bulk of the daily patient care work has been completed in this period of time and the final test results have been reported consistently between 1:00 and 2:00 p.m.

Planning of physical facilities and computer programs for the operation of the consolidated inpatient and outpatient Hematology Service have been completed. The plans include a novel architectural design which incorporates efficient organization of work flow patterns, technologist utilization and computer assisted automation. The computer programming will permit the intermittent, non-scheduled interruption of the inpatient work flow by the insertion of batches of outpatient work. The outpatient results will be available for immediate reporting so that the programs also will provide an efficient "stat" report capability.

In preparation for this step in our computer program development, we devised and instituted scheduled collection periods followed by specimen analysis periods in the AFU laboratory. Even without the computer assistance, the scheduling has decreased the interval from specimen collection to completed reports.

An on-line data entry keyboard console for recording and reporting of peripheral blood and bone marrow differentials was locally designed and was built by Berkeley Scientific Laboratories. The console has been delivered and programs for its utilization are now being "debugged". The program will provide for computer processing and printing of reports of the various kinds of peripheral leukocytes in absolute as well as relative numbers.

Utilization of a specialized centrifuge and an automatic slide staining device has increased our capabilities for examination of body fluids. It is not unusual now to provide the patient care physician with a differential count of 25 to 100 cells from a fluid containing fewer than 1 cell/cu.mm. This technique has increased the potential for finding malignant cells in body fluids and has been diagnostic of clinically unsuspected conditions including metastatic malignant melanoma and cryptococcal meningitis.

Other new procedures introduced during the year include serum and urinary neuramidase levels (Dr. Bennett) which have been invaluable in categorizing leukopenic states; urinary erythropoietin bioassay (Dr. Adamson) which has been useful in studying anemic and polycythemic patients; Oil Red O histochemical staining of bone marrow smears (Dr. Bennett) which, in conjunction with the PAS stain, shows considerable promise in helping to delineate "undifferentiated" leukemias so that the most appropriate choice of chemotherapy may be initiated. The coagulation laboratory under Dr. Gralnick now offers 14 different tests of clotting functions upon "routine" consultation.

Bone marrow examinations remained at the same level as for calendar year 1967. Although this represents a burden to the professional staff, the load has been lightened some by the training of technologist screeners by Dr. Dutcher. The training will be continued and broadened to provide more technologists of competence.

Quality control procedures involving duplication of test analysis on selected patient samples and a systemic scheduled standardization of instruments at frequent intervals have increased the precision and accuracy of the hematology test results. The average reproducibility for the tests controlled are: Hemoglobin, ± 0.2 gms.%; Hematocrit, ± 0.5 vols.%; Leucocyte count, ± 2% of the total count and Platelets, ± 4% of the total count. We now serve as a reference laboratory for the National Communicable Disease Center Survey and for the College of American Pathologists Survey.

Dr. Gralnick has been invaluably active in providing consultative services on coagulation problems for several of the Institutes. Drs. Bennett and Dutcher provide weekly morphology rounds to the Lymphoma group and the Leukemia group.

Examples of Contributions to Patient Care: In the last year the Hematology Service has consulted with the patient care physicians concerning hematologic abnormalities of their patients.

Some examples are: 1) Intensive coagulation studies on a group of four patients for NHI revealed a heretofore unrecognized coagulation disorder. These patients were subsequently treated with a new drug under the guidance of the Hematology Service which resulted in correction of their coagulation disorder and allowed these patients to undergo corrective cardiac surgery. 2) In cooperation with the Clinical Center Blood Bank, we have been able to assist the patient care physicians in understanding the effects of various drugs on red cells. We have been able in several instances to allow patients to receive necessary transfusions in the face of tests which indicated abnormalities, by demonstrating and clarifying the effect of certain drugs. 3) A unique presentation of hyperlipoproteinemia and systemic lupus erythematosis was clarified and the mechanism demonstrated by demonstrating increased in vivo and in vitro heparin resistance, suggesting to the patient care physician that therapy should constitute efforts to reduce this resistance. This mechanism also has been shown in other patients with these diseases. 4) We have assisted the NCI recently in their efforts to use exchange transfusion of blood and plasma in an attempt to reverse hepatic failure by demonstrating the effects of WBC, platelets and coagulation factors. These resulted in a normal hemostatic balance in the patients in whom this form of therapy has been attempted. 5) Elucidation of rare coagulation disorders in several leukemic patients resulted in rapid cessation of hemorrhage when appropriate therapy, based on the laboratory finds was instituted.

Collaborative Contributions: Dr. Bennett has continued collaborative projects with the Lymphoma group and has received an appointment as a member of the NIH lymphoma Task Force. He also collaborated with the NIAID in a study of ineffective granulopoiesis in the patients with Chediak-Higashi.

Dr. Gralnick has collaborated in the following research projects:

1. Dr. Robert Henkin, NHI - Effects of Copper on Erythropoiesis

2. Dr. Vincent DiVito and Dr. Paul Carbone
   Evaluation of Bone Marrow Histology in Hodgkin's Disease

3. Dr. Charles Vogel and Dr. Louis Thomas
   The Pathogenesis of Myelofibrosis and Significance in Chronic Myelogenous Leukemia

4. Mary McGinniss and Dr. Paul Schmidt
   The Effects of Various Drugs on the Coombs Test

Dr. Adamson engaged in a study of the effects of Daunomycin on bone marrow cells in vivo, with Dr. J. Whang-Peng of the NCI.

Dr. Dutcher is continuing his collaboration with Dr. John Fahey of the NCI on immunoprotein synthesis by plasma cells in vivo and in vitro. He also is engaged in a collaborative project with Dr. Louis Thomas and Dr. Costan Berard of the NCI Pathologic Anatomy Department. This project is a comprehensive study of some 45 patients with dysproteinemia and lymphomas.

Developmental Research: The program and entry console for multiple result tests are being 'debugged' and by early FY 69 we anticipate computer printout of counts of peripheral blood and bone marrow differentials. Dr. Dutcher has continued to explore the applicability of fluorescence microscopy and has directed studies by one of our contractors (Airborne Instruments Laboratory) in continuing efforts to develop an automatic reticulocyte counter.

A new Coulter electronic cell counter is undergoing evaluation for the provision of better patient care. This instrument processes samples of blood every 20 seconds and provides simultaneous analysis of 7 commonly requested procedures: hemoglobin, hematocrit, erythrocyte count, mean cell volume, mean cell hemoglobin concentration, mean cell hemoglobin and the leukocyte count. This evaluation is being assisted by a computer program which compares the results obtained by our present techniques with those results obtained from the new instrument.

Staffing: Appointments:

Dr. John Adamson, Staff Hematologist, July 1, 1967

Resignations:

Dr. John Bennett is leaving June 30, 1968 to assume new duties as Assistant Professor at Tufts Medical School, Boston.

Training: Training in bone marrow interpretation for the Medical Technologists is continuing. The technologists are also assigned to staff personnel for additional training in specialized procedures such as LDH isoenzyme separations, column chromatographic and immunoelectrophoretic techniques. One technologist has had a 4 month training course in Electron Microscopic techniques in the laboratories of Dr. Bahr at the AFIP.

Future Plans: Relatively little can be planned for expansion of our test procedures prior to the effective consolidation of the Hematology Service laboratories and the move to the 5th floor. With the small amount of extra space available to us in the fall of 1968 we hope to establish the coated-charcoal radioactive method for serum vitamin B-12 estimation. Plans are being made to utilize the computer more directly in quality control and bone marrow reports. We hope to modify existing Coulter equipment so that we can routinely perform volumetric frequency distribution curves of erythrocytes. This will give the patient care physicians information concerning the erythrocyte population contributing to the mean cell volume and may be helpful in assessing the relapse or remission status of leukemia patients if leukocyte sizing is found practical.

Infections Laboratory Services

Patient Care Services: The Infections Laboratory Services introduced several new techniques that enhanced the detection of Mycobacteria and bacterial pathogens. A new procedure for detecting occult bleeding in patients' excreta which markedly reduces the number of false positive results was adopted. The Infections Committee Report was revised to provide efficient surveillance of infections in the hospital. Tube dilution antibotic sensitivity tests were semiautomated successfully by Dr. MacLowry allowing routine performance of these tests as well as determination of inhibitory levels of antibiotics in serum to confirm adequacy of therapy. The quarterly report of the sensitivity of organisms to antibiotics was revised for more intelligent use by physicians.

The capillary tube bacterial counter developed by Dr. Bowman of NHI has been evaluated by Dr. Marsh and shows promise for the rapid detection of significant bacteriuria. The work and information flow in the Infections Laboratory Services was studied by Drs. Marsh and MacLowry and a prototype data handling and processing system is being designed.

Patient Care Contributions: The Infections Laboratory Services evaluated and adopted a new fluorescent screening method for Mycobacteria (tbc). The sensitivity of the new method is much higher than the classical Ziehl Neelsen method. A new method was developed and adopted for the rapid isolation and recognition of Beta hemolytic Streptococci and is performing reliably. The occurrence of "false positive" occult blood results has been markedly reduced by a new method that was adopted for routine use. A "rubber stamp" preliminary report system was designed and implemented that delivers a preliminary report stating the amount and category of the infecting organism and indicates that antibiotic sensitivity tests are being performed. This has eliminated the potential confusion to the physician who formerly could receive antibiotic sensitivity results before receiving the culture report and has contributed to improved care of patients with urinary tract infections. The quarterly report of the current antibiotic sensitivity test patterns of the common pathogens in the Clinical Center was revised using generic terminology throughout and categorizes the antibiotics into those used systemically, topically and in the urinary tract. This rearrangement has prevented confusion in selecting the most efficacious antibiotic and has been received enthusiastically. The monthly report to the Infections Committee has been extensively revised to be an effective tool for surveillance of hospital infections. The new report not only breaks down the hospital infections by nursing unit and Institute but includes infections seen in the outpatient area.

Our Virology Laboratory has provided a virus isolation service, but formerly had to refer paired serum specimens for serological studies to a research laboratory. Utilizing a semiautomatic instrument built to our design by BEIB, we have been able to perform these complement fixation and hemagglutination serological tests without additional personnel and no longer must depend on the willingness of the research laboratory to perform these routine diagnostic procedures for us.

The antibiotic therapy of bacterial diseases has been more an art than a science. Examples of successful therapy with a drug to which the organism is reported to be resistant and vice versa are all too common. The major factor contributing to this problem has been dependence on the disc antibiotic sensitivity method. Only in selected cases have we been able to perform the more reliable tube antibiotic sensitivity test due to the slow and cumbersome nature of the procedure. After extensive experimentation and parallel studies, Dr. MacLowry has successfully semiautomated the tube antibiotic sensitivity test and now has the capability of performing about 1500 tube sensitivity tests per week. After training other personnel in the technique, we will be capable of performing all antibiotic sensitivity requests by the superior tube dilution technique and in addition can perform serum and other body fluid antibiotic levels to confirm that adequate amounts of drug are being administered and are being effectively absorbed. This is a first in laboratory medicine and should convert what has heretofore been a therapeutic art into a science.

Examples of Contributions to Patient Care: An elderly lady admitted to NIH after 5 years of a slowly progressive illness consistent with tuberculosis or fungal disease had been investigated at two medical centers and a TB sanatorium, but the cause of the illness could not be determined: Using the new fluorescent technique, acid fast bacilli were demonstrated in the sputum, the patient was placed on appropriate therapy and recovered. Her physicians were so impressed with the efficiency of the fluorescent technique that they obtained sections of a lymph node removed from the patient at thoracotomy several years previously. We were able to demonstrate acid fast bacilli in this tissue section using the new fluorescent technique.

A young patient with Chediak Higashi Syndrome developed Staphylococcal pneumonia. The new tube dilution antibiotic sensitivity tests showed the organism to be susceptible to the synthetic penicillins and the patient was started in high doses of oxacillin. The pneumonia progressed and there was no evidence of improvement with the drug. At our suggestion, a serum inhibitory level was performed which demonstrated that the drug was being absorbed very poorly. Parenteral administration of methicillin was started and the pneumonia resolved rapidly. The ability to select the proper antibiotic by a reliable technique and then prove that adequate amounts are reaching the infection is a powerful weapon that converts empirical therapy to a scientifically rational management.

A Cuban child with acute lymphocytic leukemia was vaccinated upon entry into this country. After admission to NIH, disseminated lesions indistinguishable from smallpox developed and created a public health crisis in the hospital. Rapid action by our virology laboratory demonstrated vaccinia virus to be the cause of the illness and appropriate therapy controlled the infection.

Collaborative Contributions: Mr. Bourgeois collaborated with Drs. Hazen and Priesler of the Life Island project by performing serum and urine assays for gentamycin and neomycin, the major drugs used in sterilizing the large intestine. Mr. Bourgeois has continued collaboration with the World Health Organization Committee for Standardization of Antibiotic Sensitivities in a study of the effects of agar depth using the WHO reference medium.

Dr. H. Marsh and Mrs. Diane McDonough supplied the bacteriological design and the bacterial identification for Dr. Donald Detmer of NHI in developing a model for bacterial endocarditis in the calf. The work involved comparing the dose of Staphylococci necessary to produce endocarditis in the normal animal, the animal with tricuspid insufficiency and the animal with a mechanical heart valve. Now that base lines for the three groups have been found, the experiment will continue comparing the susceptibility of various models of heart valves to infection.

Mrs. Barbara Hobbs performed the bacteriology for Dr. Richard Williams of NCI who was investigating the detoxification by enteric flora of carcinogenic compounds. It was shown that the normal enteric flora protects the animal from the carcinogen by a detoxifying conjugation.

Dr. V. M. Young and Mrs. Dolores Kenton collaborated with Dr. Vurek of NHI and provided extensive tube dilution antibiotic sensitivity tests in parallel with evaluation of the Bowman capillary tube bacteria counter for antibiotic sensitivity tests.

Dr. V. M. Young and Mrs. Marcia Lee provided hemagglutination titers for antibodies to several serotypes of E. coli and the Salmonellae in patients with Wiscott-Aldrich Syndrome under study by Dr. Thomas Waldman of NCI.

Developmental Contracts: With the aid of a contract with Airborne Instruments Laboratory, Dr. Marsh of NIH and Mr. Rosov of AIL have developed and tested a breadboard model of an instrument which will automatically pipette liquid bacteriological samples without cross contamination and deliver the sample with a streaking motion to special agar plates. Experiments with the breadboard showed excellent reproducibility and isolation of the bacteria and suggest that much better estimates of the number of bacteria present can be made using this new technique. A prototype instrument is in the final assembly stages. Successful testing of this instrument should allow automatic planting of over half the samples submitted to this laboratory with added benefits of greater reproducibility and quantitation.

Developmental Research: The work and information flow throughout the Infections Laboratory Services was analyzed by Drs. Marsh and MacLowry. A first design of a data handling and processing system based on mark sense cards was developed and compared to the existing manual system. The design features a unit record structure in which all available information is kept together in human readable terms throughout the steps of accumulation and processing. This "breadboard" design provides the basis for a functional prototype to bring the data of the Infections Laboratory Services into the departmental computer processing and reporting system.

A prototype of the Capillary Tube Bacterial Colony Counter developed by Drs. R. Bowman, G. Vurek and P. Blume of NHI was evaluated on clinical specimens in parallel with our customary bacteriology procedures. With further development to include incubation and automatic programmed scanning, the instrument promises to be very useful for screening large numbers of urines for asymptomatic bacteriuria and could contribute substantially to the projected national health screening programs.

An automatic tissue culture media exchanger was developed and a prototype built by BEIB for Dr. Vargosko. The prototype has functioned satisfactorily and with further refinements should have application in any laboratory using tissue culture technique, relieving the technical staff of much time-consuming drudgery.

Research: Dr. A. C. Scott, Visiting Scientist from Glasgow, Scotland, has been investigating the molecular structure of capsular material from several strains of Staphylococcus aureus isolated from clinical infections.

Serologically they have been found to fall into four distinct groups. Using the classical flocculation test in which bacteriophage acts as the selective agent, he has investigated the rate at which a capsulated strain produces noncapsulated varients. Studies in animals with the noncapsulated varient have shown rapid conversion to the capsulated form and death of the animal. Dr. Scott is attempting now to characterize a capsule stripping enzyme and a cell wall lytic enzyme preparatory to investigating their ability to alter the pathogenicity of the organisms.

Dr. Wolfgang Bredt, Guest Worker from Stuttgart, Germany, investigated the method of replication of Mycoplasmata. Using oil immersion phase microscopy, he has documented with time lapse photomicrography a mycelial form of growth which breaks up into minimal reproductive spheres as the nutrients of the media are exhausted. This work invalidates one of the theories of Mycoplasma replication and greatly extends credence to the other current theory.

The return of Vietnam veterans has posed some unusual public health problems because of infections with organisms not indigenous to this country. An organism, Pseudomonas pseudomallei, the cause of melioidosis, is not characteristic biochemically and has proven to be a problem in identification. Dr. Charles Zierdt has developed an absorbed antiserum that permits immediate slide agglutination diagnosis of this organism. The only cross reaction is to Pseudomonas mallei which is easily differentiated from pseudomallei.

Dr. Behzad Mohit developed a new procedure for the selective isolation and serological typing of Salmonella from feces. The new method utilizes paper disks containing polyvalent Salmonella antiserum placed on a motility plate. Motile Salmonella grow until their flagella are immobilized by the antiserum leaving a sharp line of growth analogous to the precipitin line in an Ouchterlony plate. Experiments have shown the method to have greater sensitivity in in detecting Salmonellae and simpler processing in the detailed serological typing.

Dr. Charles Zierdt has defined and described a transitional form of Corynebacterium acnes that is isolated not uncommonly from infections. He has developed techniques where he can, at will, coerce the organism to grow either in the transitional or definitive form. Prior to this, the isolation of the transitional form caused problems in identification since it usually took at least one month to convert the organism to the definitive form. In addition, Dr. Zierdt developed a scheme for rapid identification of the definitive form of C. acnes by isolating a bacteriophage that is specific for this organism. This has great utility in the rapid identification of this organism in our laboratory and is being used routinely by the technologists.

Dr. N. Young investigated Polynucleotide Homologies among Polioviruses. RNA virus homology was examined by observing the effect of unlabeled homologous and heterologous poliovirus RNA's on the degree of duplex reformation of DMSO "melted", radiolabeled poliovirus double-stranded RNA under annealing conditions. The results indicated that 1/4 to 1/3 of the genome is conserved among polioviruses and that major genetic differences exist among the three antigenic types. Moreover, smaller reciprocal differences were detected between two "wild" strains of poliovirus, Type 1.

These studies represent the first reported success of RNA-RNA hybridization for the elucidation of genetic relatedness of viruses and facilitate a new approach to the systematics of RNA viruses which has previously been possible only with organisms whose genetic information is contained in DNA (plants, animals, bacteria, DNA viruses). The magnitude of the differences observed among polioviruses is sufficient that, were they bacteria, they would be placed in different genera. Furthermore, the existence of intratypic differences now makes is feasible to examine definitively the genetic variation between virulent and avirulent strains and provides a new tool which may prove useful in future vaccine development of these and related viruses.

Dr. Robert Chambers working with Dr. James Rose, LBV, NIAID, has prepared a highly purified viral specific DNA from Herpesvirus hominis. After confirming its viral DNA-RNA hybridization specifically, he prepared a synthetic Herpesvirus hominis RNA using the purified DNA as a template. With these reagents, DNA-RNA hybridization experiments have been performed to detect relatedness between Herpesvirus hominis and DNA or RNA extracted from a Burkitt Lymphoma cell line, cytomegalovirus infected cells, and several presumed Herpesvirus hominis cell lines received from several other investigators in the country. These experiments are promising and will be pursued further. He has also investigated an unusual non-DNA dependent RNA found in a cell line obtained from a patient with infectious mononucleosis. His work with Cytomegalovirus infected cells has led to the isolation of an interesting RNA which promises to better define the infectious nature of this virus.

Dr. Viola M. Young, Mrs. Barbara Hobbs and Mrs. Dolores Kenton studied a group of atypical Enterobacteriaceae isolated in our laboratory that had previously been included with the genus Enterobacter. Their findings resulted in the proposal of a new genus which has been submitted to the International Subcommittee on Enterobacteriaceae.

Mr. Louis Bourgeois and Dr. Viola M. Young studied the effects of prediffusion time and the use of salt free media to prevent the spreading of Proteus species for application in the disk diffusion antibiotic sensitivity test.

Staff Changes: Appointments: Dr. Harry H. Marsh, Chief, Infections Laboratory Services; Dr. James MacLowry, Assistant Chief; Dr. Robert Chambers, Assistant Chief for the Virology Laboratory, Infections Laboratory Services.
Resignations: Dr. Viola Mae Young, Chief of the Microbiology Service resigned to become Chief of Microbiology, Clinical Branch, National Cancer Institute, Baltimore Cancer Research Center. Dr. Andrew Vargosko, Chief of the Virology Laboratory resigned to assume new duties with Litton Industries.

Future Plans: Modifications of Methods and instruments are planned to effect broad application of the successful prototype instruments for automatic culture planting and incubation, semiautomatic complement fixation and hemagglutination tests and routine tube dilution antibiotic sensitivity tests. When fully implemented, these improvements will effect maximum reduction of time-consuming manual operations and provide increased technologist productivity.

Writing of computer programs, parallel operations and initial debugging of prototype reports within a comprehensive data processing scheme for the Infections Laboratory Services will be undertaken during FY 1969.

Research, Development and Laboratory Automation Section

Long Range Goals: Effective automation must substantially increase productive capacity and improve efficiency, reliability and accuracy in the laboratory. Original objectives were established to automate 80-90% of sample assay work, speed up analytical procedures by a factor of 2 or 3, increase work capacity five-fold and reduce automated test unit costs by 10. Design objectives included elimination of human error as much as possible and increase of accuracy and reproducibility of every test by technical and medical quality control. By the end of fiscal 1968 these objectives will have been achieved for about half of the laboratory operations. Although, as might be expected, we have encountered much difficulty in achieving the required operational reliability from a prototype computerized system, during fiscal 1969 the major revision and debugging should be achieved and thereafter additional on-line tests may be incorporated with much less effort and expense. Ultimately, additional computer programs should provide correlated profiles and diagnostic and therapeutic interpretations of complex arrays of patient test data.

Achievements: During this year, 10 on-line tests in Chemistry and 8 on-line in Hematology have been serving patient care daily, and represent respectively 40% and 60% of the daily numerical work loads in these laboratories. Over 80% of formerly manual paper work is now computer processed in these two services including report writing for all of Chemistry and for single-result tests in Hematology. Test accuracy and reliability have been improved. The work unit production per technologist per day has risen from 70 to over 100 in Chemistry. More remarkable is the absorption of the large amount of additional effort required in development of methods for automation, evaluation of new instruments, and daily performance of double analytical work, once for patient care service and again for debugging and integration of automated test programs into the computer system. These increases in productivity would not be possible without the improved efficiency of automated assay procedures and data processing.

On-Line Data Collection from Remote Keyboard Consoles:

Single Result Test Consoles. The off-line entry of chemistry results of nonautomated tests has been performed with mark-sense result cards involving 12 sequential steps and requiring punch machine conversion to punched holes. General purpose data entry keyboard consoles have been installed for on-line entry of single-result tests in Chemistry and Hematology. These BSL consoles permit efficient, direct input of data, immediate visual verification before transmission to the computer, and instant correction of results when necessary. The programs to process these on-line data, utilizing the new CDC disks, have been completed. The system has been in daily operation for all single-result tests in Chemistry and Hematology during the last quarter of FY 1968, and has proven to be effective.

Multiple Result Test Consoles. Development is under way for similar on-line automated data collection of multiple result tests. In Hematology, a newly developed console will collect white cell differential counts and red cell morphology results. The prototype model, now being evaluated at the bench, incorporates an engineering advance in the technique of local buffer storage of multiple data from a single sample identity before transmission to the computer.

On-Line Test Assay. Preparations for addition of 10 automated on-line tests in Chemistry plus four test blanks (14 new on-line channels) have necessitated exhaustive laboratory evaluation of the best procedures and daily operational trials of assay equipment combinations devised by our staff in chemistry. Review of this experience, of the developing patterns of medical requirements for tests, and of the need for individual serum blank measurements for certain tests to attain better accuracy, has necessitated rearrangement of test combinations on the AutoAnalyzer samplers. This is illustrative of the flexibility that must be preserved despite the restrictions which an automated, computerized system tends to impose, so that medical and scientific requirements will remain paramount.

Computer Equipment Improvements. Modifications of the computer equipment were found necessary to allow addition of on-line tests, eliminate bottlenecks in printing, incorporate new improved software from CDC, enable more efficient and flexible programming and provide capacity for microbiology data processing. The replacement of two CDC printers (150 line per min. model 3152 and 500 line per min. model 505) with one 1000 line per minute model 501 has provided much faster printing of laboratory worksheets, lists and patient reports and faster program assemblies, debugging corrections and revisions. Replacement of the two IBM-1311 disk drives with three CDC-853 disk drives achieved a three-fold increase of random access storage capacity and faster access time and will enable utilization of newly available and more efficient CDC systems software, the Mass Storage Operating System (MSOS). These changes not only have increased the system capability but have decreased the annual rental costs.

The period of complete interruption of computer processing needed to install the substituted equipment sharply increased the load on our already overloaded technical and clerical staffs and disclosed inherent limitations in the punch card, electric accounting machine (EAM) backup for a sophisticated computer system. The "down" period in the face of a continuing 132% work load in chemistry clearly demonstrated our increasing dependence on the computer system to maintain a high level of productivity. It emphasized our need to develop a more adequate and sophisticated backup capability.

Programming Development. We have had daily operating experience with on-line real-time computer processing since July 1966. This involved initially six tests on-line in Chemistry, and subsequent expansion to 18 tests on-line in Chemistry and Hematology, as well as off-line processing for all but a small portion of the manual reporting for these two services. This prototype system was understandably incomplete and had many operating defects. A detailed documentation of this experience and thorough analysis of the deficiencies of the prototype system and daily operating requirements have been accumulated to guide improvements for a more adequate system, which requires extensive program revisions. As an interim procedure we implemented a partial revision of the prototype programs to overcome daily operating bugs, incorporate some additional tests on-line, permit an upgrading of computer equipment, and enable a smooth transition to a more versatile and flexible processing system of second generation level. However, detailed analysis of the changes and debugging required to incorporate 14 new AutoAnalyzer channels in the inflexible prototype, executive and processing programs revealed that the effort and expense involved could not be justified in terms of the patched and restricted result and that the same effort would be much more productive in major programming revisions to attain a second generation executive and processing program of modular design and sufficiently flexible for future additions. The second generation edition will utilize the recently available and more efficient CDC software system (MSOS) for on-line data collection, time-shared with offline processing and batch processing. Design of the revised real-time executive and processing programs for the second generation operating system was completed in FY 68 and program writing and debugging will proceed in FY 69, leading to graduated implementation.

Data Storage and Retrieval. Experience with our first design of patient data storage magnetic tape files has disclosed many flaws and unacceptable limitations. An extensively revised design for a more comprehensive, flexible and efficient record file has been developed in the form of an active patient file and a long term or inactive file. Its further development and implementation must await completion of the revised daily executive and processing routines, utilizing MSOS. However, using the current prototype software and files we have been able to generate cumulative summary reports on each patient at two-week intervals for evaluation and trial use by our staff in quality control and consultation. These summary report programs have been undergoing further necessary debugging. Provision of such reports to all wards on a weekly basis is desirable, but will require competent computer operators willing to work the third shift. Several valuable quality control programs have been developed for daily use. These provide reports of electrolyte balance, results in pathological ranges related to individual patients, histograms of frequency distribution of results on particular tests, and modal and mean values of tests in the normal range.

Problems with Computer System.

Rain Flooding: In addition to the problems common to new developmental efforts, unexpected difficulties were encountered as the result of serious rain flooding into the computer room on seven occasions during July and August 1967 due to construction of new floors in the D-Wing. This not only disrupted all work during those days and one or two days subsequently for repairs of equipment exposed to wetting or severe humidity, but later caused many instances of subtle, intermittent malfunctions. These hardware failures imitated program failures, which necessitated exhaustive searching to determine the cause and occupied much of our contractor's efforts. These failures have been cleared up one by one, but the resultant delays have interfered with our planned schedule of completion dates.

Failures in Daily Operation: Regardless of the degree of automation of a laboratory, patient care service is not improved and cannot be maintained on a reliable basis unless all components of the system work perfectly. Although, when operating properly, this automated system relieves the technical staff of much time-consuming and fatiguing routine drudgery, there have been too frequent failures of equipment, programs, and people. Among the lessons learned is the startling fact that an automated system relying on a single processing computer is a complex of synchronized, intricately interdependent parts and actions, and is thereby subject to total failure if any critical, tiny component or single electronic or mechanical action fails.

Reliability of the total system is affected differently by failures in two categories of equipment and operation: peripheral input components such as on-line assay instruments; and the central processing, control and output machines such as computer and line-printer. With each there is human-machine interaction which is critical for reliable and continuous operation. Failure of one of the input assay instruments or signal channels should not cause total system failure, but failure of even one signal recognition, a parity error, or breakdown of any circuit or program component of the single main computer processor will halt the entire system until that fault is found and corrected. Human error in operating single input assay instruments hazards only that small part of the system and is readily corrected, but human error in operating the central processor (punching the wrong key, turning the wrong switch, forgetting a control card, etc.) stops the entire system and may even lose some previously accumulated data.

In a patient care service it is mandatory to determine by operating experience all the error and failure conditions, both machine and human, of automated assay instruments and test result processing systems and to improve equipment and programs to avoid, correct, and recover from such errors and failure. Adequate and immediate backup must then be devised for each possible breakdown of the system.

Staffing:

Appointments: Dr. Clement J. McDonald, a physician on CORD deferment while completing nearly two years of training in the Biomedical Engineering Program at Northwestern University involving medical applications of computers, joined the Research, Development and Laboratory Automation Section as Staff Physician in May 1968. Mr. Louis Stano was appointed as electronics maintenance technician and performed very well for several months, but left to take a higher paying position in industry. There is a severe shortage in this area of qualified electronic technicians and computer operators. We have been very fortunate recently in recruiting two capable young men with good experience in computer operation, Mr. Edward Boothroyd and Mr. Karlton Jackson, who are willing to work on a rotating third shift or weekends and will be able to following the necessary period of experience with our specialized computer system. This will provide better utilization of our computer and enable us to meet rising requirements because of greater programming effort and more kinds and volume of data retrieval, cumulative and interpretive reports which are becoming increasingly valuable for patient care. We will also be able to proceed with our plans for gradual release of Mr. John Stimpson, formerly supervisory technologist in Chemistry, who has become an expert computer operator and supervisor, to assume greater responsibilities as Laboratory Computer Manager which involve supervision and coordination of data processing activities in chemistry and hematology laboratories and in Electric Accounting Machine Unit, and coordination with hardware engineers and programmers on continuing changes in the computer system operation.

Resignations: Mrs. Shirley B. Williams, EAM operator, resigned to remain at home with her new child. Mr. Stano resigned as noted above.

Future Plans.

A major part of the R&D effort during FY 69 must be devoted to achieving the necessary operational reliability. It is not valid to express the degree of automation in terms of percent of workload (number of analyses of samples) except when "all systems are go". In the present prototype system, a single error by an assay machine, technician or the computer operator can (and often does) cause an interruption of the whole system. This problem emerges as the inherent disadvantage of utilizing a single computer for a complex of real-time on-line laboratory operations which must be performed in parallel mode.

Uninterrupted operation is customarily accomplished by redundant duplication of the main system components, but this is too expensive for the economy of a hospital service. On the other hand a system composed of modular and potentially independent components operating in parallel is not so critically interdependent, and failure of one part does not stop the whole system. To achieve operational reliability will require development of alternative processing pathways and backup equipment, used as part of the daily operating system but capable of independent emergency operation in case of central processor failure. The backup processing system must be able to maintain continuing productivity in the laboratory. A thorough review and analysis of this problem has revealed that the most practical and economic backup design involves small processors and control components in each laboratory service which operate routinely as preprocessors for on-line data acquisition and input queueing to our main laboratory computer (CDC 3200), but which can take over emergency processing functions in case of main computer failure without serious interruption of immediate productivity, while deferring the more complex retrieval and statistical quality control operations until the total system is restored. Error detection, error message feedback to operators, other failure indicators and instructions to operators and recovery programs are necessary for an adequate backup procedure. This configuration will be initiated in FY 69, and can eventually release the main computer for the broader range of processing that will be required.

The projected schedule of development includes a major revision of the real-time executive program, designed to utilize the Control Data Mass Storage Operation System (MSOS) software package, to control on-line processing and enable addition of more on-line and buffered on-line data channels from Chemistry. By taking advantage of the MSOS, the revised executive and processing programs will reduce preoccupation of the computer with "baby sitting" the real-time AutoAnalyzer inputs, providing greater flexibility for incorporation of additional processing routines for Microbiology, quality control routines, new tests or modified procedures in all three services, and on-demand patient data retrieval and summaries. The implementation of this second generation programming system will proceed in graduated steps during FY 1969 continuing with checkout and parallel operation along with the current prototype system. When thoroughly debugged, the second generation edition will become the routine daily processing system.

STAFFING

Office of the Chief

Appointments

Dr. Daniel Bruce, resident.
Dr. James Gallup, resident.
Dr. Richard Jaqua, resident.
Dr. John Otis, Assistant to the Chief, Clinical Pathology Department.

Resignations and Transfers

Dr. Howard Sussman will be leaving to take a full-time research position.
Dr. Jack Jackson will be leaving to accept a position as Chief of Clinical Chemistry Service at the University of Texas Medical School in San Antonio, Texas.
Dr. Robert Chambers will be leaving to accept a position at Georgetown University, where he will organize a diagnostic virology laboratory.
Dr. Joseph Wilson will transfer to the Pathologic Anatomy Department, NCI on July 1.

Awards and Honors

Group awards have been requested with justifying documentation for the technical staffs in Clinical Chemistry and Hematology. These were recommended for the superior performance far beyong the customary demands of duty. These technologists responded to the continuous demands for duplicate work of repeating tests for evaluation and debugging both automated instruments and related computer programs. Frequently after having completed patient care work during the working day this extra work required staying into the night hours. Also leaders of these groups were very effective in implementing the necessary modification of work flow procedures and habits to provide more efficient laboratory operations for automation.

Incentive within grade pay increases were awarded eight members of the department for their unusual effectiveness and leadership in our developmental and patient care services programs.

PROPOSED COURSE AND FUTURE PLANS

Our primary objectives in patient care laboratory service will be pursued by continuing efforts to develop improved methods and automation of additional analytical procedures for on-line or indirect entry into the computer processing system. These will include in Clinical Chemistry assays for cholesterol, amylase, lipase, protein bound iodine, amino acids, groups of enzymes and automation of routine urinalysis. Development and design of a more efficient machine and human readable sample identification system will take high priority. To substantially increase the capacity of automated assay methods to process large numbers of samples and decrease technician effort several newly available automated machines will be evaluated including the Technicon SMA 12/60, Beckman Discrete Sample Multichannel Analyser and possibly the Hycel Mark X multichannel analyser.

For Hematology, differential cell counts, coagulation tests and serum iron tests are planned for integration into the automated data collection system. In Hematology and Clinical Chemistry together, our plans are to attain the level of 80% of the routine work load to be accomplished by automated and semiautomated methods.

In the Infections Laboratory Services we plan to complete design and fabrication of the pilot model of an automated specimen inoculation machine for bacteriological cultures and to start practical laboratory evaluation. Analyses of laboratory operating procedures will be completed and a data handling, computer input and report printing system will be designed and tested for microbiology.

Plans for further R & D in computer processing of laboratory data include: a) completion of the revised supervisory program utilizing the Control Data Mass Storage Operating System, b) completion of patient data storage and retrieval programs, c) implementation of abnormality alert routines to print attention asterisks and comments on reports of abnormal results, d) implementation of periodic patients' laboratory data summaries for use of patient care physicians, e) special data summaries for evaluating response to therapy (NCI) and particular clinical studies (NIAMD, etc.), f) program subroutines for processing and reporting multiple-result tests such as differential leukocyte counts and routine urinalysis, g) internal laboratory technical and biological quality assurance programs, and h) error display programs and equipment in the automated laboratories.

Another important aspect will be the development of modular raw data capturing buffer equipment (real-time, on-line) to release computer time during the day for patient data processing and reporting and to provide adequate backup and data protection during periods of computer failure.

Our efforts to improve efficiency and quality of patient care laboratory services included a critical review of our methods and operation and the adequacy of our test armamentarium by outside consultant experts in the several specialties of clinical pathology. Each consultant visited our department for several days late in 1966 and submitted reports to the Chief. These reports were reviewed in detail by the senior professional staff during 1967 and assisted substantially in our planning.

Space limitation is the most important factor affecting our progress and future plans and will continue to be a factor even after addition of space in the fifth floor within the next year. Every effort has been made to plan space consolidation, especially in Chemistry and Hematology, for maximum utilization. This will require considerable structural alteration on the 4th floor for Chemistry after Hematology is moved to the 5th and 1st floors.

Utilization of manpower resources must be improved. To relieve pressure of a very large load of bone marrow examinations on a limited hematology staff Dr. Dutcher is training several highly qualified medical technologists to read marrow preparations to screen normals. This will enable the hematologists to devote more effort to the abnormal marrows. In Clinical Chemistry we plan to consolidate all similar automated instruments into larger laboratories where one or two specially trained "laboratory machine operators" (high school level education) could operate all the equipment under the supervision of one competent senior chemist or technologist. Similar plans are being made for operation of automated equipment in Hematology.

Professional training of clinical pathologists (residency program) is one of the most important contributions to laboratory medicine in this country made by NIH during the past 15 years. Our program became a model for the profession and the College of American Pathologists and American Society of Clinical Pathologists have become accustomed to looking to us for leadership. Also, six of our "graduates" are in positions of leadership and heads of sections or branches as pathologists in the USPHS. Sixty percent of our residents have gone to academic positions. However, limitations of space and senior professional staff have curtailed the much needed improvement and expansion of our residency program.

The needs of the country, especially in view of the government encouraged and financed national medical care programs, obligates us to train more residents in laboratory medicine. We must provide more space for their study and work; their learning experience must include more contact with patient care physicians with members of our senior staff to guide physiological interpretation and correlation of multitest profiles. They should have experience in use of computer applications and laboratory management. The scientific method is so important in the study of patients as well as the study of basic physical and chemical phenomena that all residents should collaborate in clinically oriented research problems with senior staff members.

We should organize a much needed program for post-residency training of fellows in the specialties of laboratory medicine. There are very few institutions in this country where such training in depth is available, and there is a great need for specialized clinical pathologists and doctoral laboratory scientists.

Plans for research emphasize reestablishing opportunity, space and support for personal research pursuits by each of the professional staff. If this is not done we cannot retain these highly competent and productive people, who constitute our most valuable asset. Furthermore, each must keep his research interest and skills (intellectual and technical) active or his ability and motivation will lag and his contribution in the research environment of NIH will deteriorate. Our research approaches will continue to emphasize the value and challenge of clinical laboratory problems related to pathogenesis, pathologic physiology, diagnosis and reaction to therapy as well as methodology.

PUBLICATIONS

Adamson, J. W.: The erythropoietin/hematocrit relationship in normal and polycythemic man: Implications of marrow regulation. Blood. 1968. In press.

Adamson, J. W., and Finch, C. A.: Erythropoietin and the polycythemias. Trans. N. Y. Acad. Sci. 1968. In press.

Bennett, J. M., and Desforges, J. F.: Quinine induced hemolysis: mechanism of action. Brit. J. Haemat. 13: 706-711, Nov. 1967.

Bennett, J. M., Nathanson, L., and Rutenburg, A. M.: Significance of leucocyte alkaline phosphatase in Hodgkin's Disease. Arch. Int. Med. 121: 338-341, Apr. 1968.

Bennett, J. M., Ruberg, J., and Dixon, S.: A new semiautomated method for the concentration of cerebrospinal fluid for cytologic examination. Amer. J. Clin. Path. 1968. In press.

Bennett, J. M., Ruberg, J., and Dixon, S.: A new semiautomated method for the concentration of cerebrospinal fluid for cytologic examination. Tech. Bull. 1968. In press.

Bennett, J. M., Rutenburg, A. M., Hall, T., and Nathanson, L.: Significance of leucocyte alkaline phosphatase in Hodgkin's disease. Clin. Res. 15: 334, Apr. 1967. Abstract.

Bennett, J. M., Yu, D., Syemoto, J., and Pechet, L.: The effects of infusing thrombin and its acetylated derivative. II. Observations on intravascular hemolysis with pathologic correlations. Thromb. Diath. Haemorrh. 1968. In press.

Bourgeois, L. D., Branche, W. C., and Ramey, F. H.: New combination of antibiotics for treatment of contaminated specimens for viral studies. Appl. Microbiol. 15:1070-1073, Sept. 1967.

Bull, B. S.: On the distribution of red cell volumes. Blood 31: 503-515, Apr. 1968.

Bull, B. S., Dutcher, T. F., and Siggard-Andersen, O.: The Hem-Aliquanter: A dispenser-dilutor for hematology. Amer. J. Clin. Path. 29: 295-298, Feb. 1968.

Cotlove, E.: Anion measurements in Biological Materials. Ann. N. Y. Acad. Sci. (Bioelectrodes) 148: 110-114, Feb. 1968.

Cotlove, E., Young, D. S., Morton, G. W., and Trias, J. J.: Design of a fully automated discrete sample processing enzyme assay system for clinical chemistry. Clin. Chem. 13: 678-679, Aug. 1967.

Feingold, I., Fahey, J. L., and Dutcher, T. F.: Immuno-fluorescent studies of immuno-globulins in human lymphoid cells in continuous culture. J. of Immuno. 1968. In press.

Gralnick, H. R., and Dittmar, K.: The development of myeloblastoma with massive breast and ovarian involvement in acute leukemia. *Cancer*. 1968. In press.

Gralnick, H. R., and McGinniss, M. H.: Immune cross-reactivity of penicillin and cephalothin. *Nature* (London) 216: 1626-1627, Dec. 1967.

Gralnick, H. R., Wilson, J. T., McGinniss, M., and Schmidt, P. J.: Drug-related positive direct Coombs tests. *Amer. J. Clin. Path*. 49: 241-242, Feb. 1968.

Gralnick, H. R., Wright, L. D., and McGinniss, M. H.: Coombs positive reactions associated with sodium cephalothin therapy. *JAMA* 199: 725-726, Mar. 1967.

Johnson, R. E., Doppman, J., Harbert, J. C., Steckel, R. J., and MacLowry, J. D.: Prevention of radiation nephritis with renal artery infusion of vasoconstrictors. *Radiology* 1968. In press.

Johnson, R. E., Kagan, A. R., Gralnick, H. R., and Fass, L.: Radiation induced remission in chronic lymphocytic leukemia. *Cancer* 20: 1382-1387, Sept. 1967.

Laga, E.: Characteristics of phosphohydrolase and phosphotransferance reactions catalyzed by human placental alkaline phosphatase. *Fed. Proc*. 27: 788, Mar.-Apr. 1968. Abstract.

Mohit, B.: Disc immunoimmobilization method for simultaneous typing and isolation of salmonella flagellar phases. *J. Bact*. 1968. In press.

Peterson, J. I., and Young, D. S.: Evaluation of the hexokinase glucose-6-phosphate method of determination of glucose in urine. *Anal. Biochem*. 1968. In press.

Rosenberg, S. J.,and Bennett, J. M.: Pyridoxine responsive anemia. A case report. *New York J. Med*. 1968. In press.

Rubin, R., Gralnick, H. R., Niemetz, J., Estren, S., and Wasserman, L. R.: The use of animal AHG--concentrates in patients with circulating anticoagulants. *Ann. Intern. Med*. 64: 1165, May 1966. Abstract.

Ryschenkow, E. I., Wertlake, P. T., and Young, V. M.: Mycoplasma pseudo-colonies from cultures of buffy coat of blood. *Canad. J. Microbiol*. 13: 1053-1055, Mar. 1967.

Siggard-Andersen, O., and Bull, B. S.: Pipetting of ultramicro samples--methods in microchemistry. *Amer. J. Clin. Path*. 48: 502-509, Nov. 1967.

Skeel, R., Henderson, E., and Bennett, J. M.: Significance of bone marrow lymphocytosis in acute leukemia. *Blood*. 1968. In press.

Steckel, R. S., MacLowry, J. D., Holland, J. M., Paulson, D. F. and Johnson, R. E.: The Seldinger catheter in radiation therapy. *Radiology* 89: 332-335, Aug. 1967.

Sussman, H. H.: Evidence that the increased serum alkaline phosphatase activity in patients with osteomalacia or Paget's disease is from liver phosphatase isoenzyme. *Clin. Res*. 16: 130, Jan. 1968. Abstract.

Sussman, H. H., and Laga, E.: Inorganic pyrophosphatase activity of human placental alkaline phosphatase. *Biochem. Biophys. Acta* 151: 281-283, Jan. 1968.

Sussman, H. H., and Laga, E.: Orthophosphate as substrate for phosphotransferase reactions catalyzed by human placental alkaline phosphatase. *Biochim. Biophys. Acta* 1968. In press.

Sussman, H. H., Small, P. A., and Cotlove, E.: Human alkaline phosphatase--immunochemical identification of organ-specific isoenzymes. *J. Biol. Chem*. 243: 160-166, Jan. 1968.

Whang, J., and Bennett, J. M.: Cytogenetic findings in Neuroblastoma. *Amer. J. Dis. Child*. 1968. In press.

Williams, G. Z.: Effects of automation on laboratory diagnosis. *Calif. Med*. 108: 43-45, Jan. 1968.

Williams, G. Z.: Individuality of clinical biochemical patterns in preventive health maintenance. *J. Occup. Med*. 9: 567-570, Nov. 1967.

Williams, G. Z.: Laboratory automation systems; availability and procurement. *Bull. Coll. Amer. Path*. 21: 383-387, Dec. 1967.

Young, D. S.: Systematic screening for abnormal urinary constituents. *Clin. Chem*. 1968. In press.

Young, D. S., and Cotlove, E.: Evaluation of performance of a fully automated enzyme assay system. *Clin. Chem*. 13: 679-680, Aug. 1967.

Young, V. M.: Sections of shigellosis and colienteritis. In Jelleff, D. B. (Ed.): *Disease of Children in the Sub-tropics and Tropics*. London, Ed. Arnold. 1968. In press.

Young, V. M., Branche, W. C., Jr., and Lee, M. R.: Ultraviolet-induced colcines of *Escherichia Coli* from the normal human intestine. *J. Path. Bact*. 92: 303-311, Oct. 1966.

Young, V. M., Lee, M. R., Branche, W. C., Jr., and Kenton, D. M.: Shigella flexnin antibody levels in 969 normal individuals. *Amer. J. Public Health* 57: 2104-2110, Dec. 1967.

Zierdt, C. H., Rude, W. S., and Bull, B. S.: Protozoan characteristics of Blastocystis hominis. *Amer. J. Clin. Path*. 48: 495-501, Nov. 1967.

Zierdt, C. H., Webster, C., and Rude, W. S.: Study of the anaerobic corynebacteria. *Int. J. Syst. Bacteriol*. 18: 33-47, Jan. 1968.

Presentations at Meetings:

Morton, G. W., Trias, J. J., Cotlove, E., and Young, D. S.: A discrete sample processor for kinetic absorption measurements. Verbal paper. Conference on Engineering in Medicine and Biology, 20th Annual Meeting, Nov. 13-16, 1967, Boston, Mass.

Young, D. S.: A computer assisted study of autoanalyzer performance. 11th Annual Meeting, Canadian Society of Clinical Chemists. July 3-7, 1967. Montreal.

Young, D. S.: Lectured at UCLA, Los Angeles, Calif., April 6, 7, 1968. Extension course on integration of analytical instruments with a computer.

Table 1

Average Monthly Work Load Statistics for the Clinical Pathology Department, FY 1968

	1st Quarter	2nd Quarter	3rd Quarter	Estimated 4th Quarter	Total 12 Month Projection
Average Patient Census	351	362	356	360	
Total Patient Days	7,507	7,497	7,251	7,400	91,000
Available Tech. Days	1,084	1,085	1,073	1,082	13.000
Total Work Units	97,521	94,438	99,326	101,000	1,178,000
Work Units/ Tech/Day	90	87	92	92	
Work Units/ Patient/Day	13.0	12.6	13.4	13.3	

Table 2. List of Formal Training Courses Completed by Staff FY 1968

Name of Employee	Title of Course	Dates	Location
Dr. John Adamson	Biochem. 200C	9/67 - 1/68	FAES
"	Biochem. 206	9/67 - 1/68	"
"	Biochem. 110	9/67 - 1/68	"
"	Math. 101	2/68 - 5/68	"
"	Biochem. 200D	2/68 - 5/68	"
"	Chem. 140	2/68 - 5/68	"
"	Basic Radiological Health	4/29/68 - 5/10/68	Nat. Center for Radiological Health
Dr. John Bennett	Basic Radiological Health	10/67 - 11/67	Nat. Center for Radiological Health
"	Biochem. 206	9/67 - 1/68	FAES
"	Bio. 108	2/68 - 5/68	"
Dr. Daniel Bruce	Math. 103	9/67 - 1/68	Univ. of Maryland
"	Math. 112	2/68 - 5/68	"
Dr. Robert Chambers	Physics 149	2/68 - 5/68	FAES
Dr. Ernest Cotlove	Genetics 202	2/68 - 5/68	"
Dr. James Gallup	Bio. 103	9/67 - 2/68	"
"	Parasitology	10/67 - 12/67	NIAID - CC
"	Bio. 108	1/68 - 5/68	FAES
"	Genetics 202	1/68 - 5/68	"
Dr. Richard Jaqua	Anatomy 120	9/67 - 1/68	"
"	Parasitology	10/67 - 12/67	NIAID - CC
"	Genetics 202	2/68 - 5/68	FAES
Dr. Emil Laga	Effective Speaking	6/5/67 - 6/23/67	DHEW - NIH, Bldg. 31
Dr. James MacLowry	Bio. 102	2/68 - 5/68	FAES
"	Math. 101	2/68 - 5/68	"
"	Anatomy 120	9/67 - 1/68	"
Dr. John B. Otis	Bio. 108	2/68 - 5/68	"
Dr. Joseph Wilson	Math. 10	2/68 - 5/68	"
"	Effective Speaking	6/5/67 - 6/23/67	DHEW, NIH, Bldg. 31
Dr. Viola M. Young	Effective Speaking	6/5/67 - 6/23/67	DHEW, NIH, Bldg. 31
Dr. John B. Otis	Report Writing	9/11/67 - 9/29/67	DHEW, NIH, Bldg. 31
Dr. Harry Marsh	Bio. 102	2/68 - 5/68	FAES

Table 2. List of Formal Training Courses Completed by Staff FY 1968

Name of Employee	Title of Course	Dates	Location
Dr. Donald S. Young	Reading Improvement	11/6/67 - 12/15/67	DHEW, NIH, Bldg. 31
Bourgeois, Louis D.	Bio. 102	2/68 - 5/68	FAES
Bowman, Miriam	Genetics 12	3/68 - 5/68	"
Bremer, Diane	Bio. 103	9/67 - 1/68	"
Dixon, Strother P.	Anatomy 120	9/67 - 1/68	"
French, Sally S.	Bio. 102	2/68 - 5/68	"
Gersch, Sylvia	Bio. 102	2/68 - 5/68	"
Henderson, Patricia	Bio. 11	2/68 - 5/68	"
Nishi, Hiroshi	Effective Writing	3/11/68 - 3/29/68	DHEW, NIH, Bldg. 31
Nunn, Myrthel	Bio. 102	2/68 - 5/68	FAES
Schaff, Boyd	Biochem. 100	9/67 - 1/68	"
Selepak, Sally	Parasitology	10/67 - 12/67	NIAID - CC
Young, Mary Jo	Bio. 102	2/68 - 5/68	FAES

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

CLINICAL & PROFESSIONAL EDUCATION SECTION

CC-01
Serial No.

TABLE OF CONTENTS

General . . . . Ed- 1

The Residency Programs . . . . Ed- 1

The CORD Program . . . . Ed- 2

NIH Associate Matching Program . . . . Ed- 2

Tables:

1. Statistics on the Matching Program . . . . Ed- 3

2. Tabulation of Medical Schools, Applicants, and Appointees . . . . Ed- 4

3. Tabulation of Hospitals Providing Internship Training for Current Candidates and Appointees . . . . Ed- 7

Appendix

I. Schedule for Clinical, Research, and Staff Associate Matching Program for CY 1968 . . . . Ed-11

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

CLINICAL & PROFESSIONAL EDUCATION SECTION

CC-01
Serial No.

GENERAL

The Clinical & Professional Education Section assists the medical and scientific staff of the Institutes administratively and procedurely by (1) conducting a Matching Program whereby the junior staff members are recruited and selected for appointment to Associateships (with interim deferment from military service), (2) providing assistance in residency training and related programs, and (3) providing general liaison for such programs.

THE RESIDENCY PROGRAMS

The Clinical Center professional departments which have complete residency training are:

Service	Approval	Residents Currently in Training
Anatomical Pathology 1/	3 years	6
Clinical Pathology 1/	3 years	9

1/ Combined 4-year program in Clinical and Anatomical Pathology is offered.

THE CORD PROGRAM

The Commissioned Officer Residency Deferment Program, developed and conducted by the PHS with the cooperation of the Selective Service System, permits a limited number of draft-eligible physicians (1) to become Inactive Reserve officers in the PHS, and (2) to complete one or more years of formal residency training before serving on active duty. The mechanisms established in this program have been successfully incorporated into the selection process for Clinical, Research, and Staff Associates. Deferments are arranged by this office through official channels.

NIH ASSOCIATE MATCHING PROGRAM

The NIH Associate Matching Program was developed in 1958 to provide an orderly operational plan for the selection of Clinical, Research, and Staff Associates by the various Institutes. It is designed to minimize unproductive processing of applicants. This system also makes it possible for those candidates not selected for appointment at NIH to be recruited by other Bureaus of the Public Health Service.

After review of all candidates' qualifications by the Institutes, a limited number of candidates are selected for personal interviews, which are arranged through this office. Following interviews, candidates are requested to indicate their preferences for specific Associate positions, which are kept in confidence and used exclusively for matching against the Institutes' nominations. Successful candidates are notified by telephone and are given an opportunity to accept or reject the positions for which they were matched.

Selections are usually made two years in advance and successful candidates are considered for residency deferment through the PHS CORD Program until their effective date of appointment.

With a view toward increasing the time available to the Institutes for the review of applications, this year we are converting to an automated system for scheduling the interview appointments.

Table 1. Statistics on the Clinical, Research, and Staff Associate Matching Program, Calendar Year 1967

Applications distributed on request	1,231
Applications received from candidates	692
Ineligibles and withdrawals	23
Candidates interviewed	476
Total selected for appointments	226

	Calendar Year Active Duty is to Begin					
	TOTAL	1968	1969	1970	1971	1972
Clinical Associates	113	3	82	9	15	4
Research Associates	37	6	31	-	-	-
Staff Associates	72	50	20	1	1	-
RAPT	4	1	3	-	-	-
Total	226	60	136	10	16	4

Table 2. Tabulation of Medical Schools, Applicants, and Appointees, Calendar Year 1967

Schools	Applicants	Appointees
Alabama		
Medical College of Alabama	4	3
Arkansas		
University of Arkansas School of Medicine	1	1
California		
Loma Linda Univ. School of Medicine	2	1
Stanford University School of Medicine	12	7
Univ. of California School of Medicine, L.A.	5	1
Univ. of California School of Medicine, S.F.	8	3
Univ. of Pacific, College of P & S	1	-
Univ. of Southern California Sch. of Medicine	7	3
Colorado		
University of Colorado School of Medicine	3	1
Connecticut		
Yale University School of Medicine	27	10
District of Columbia		
Georgetown University School of Medicine	5	1
George Washington Univ. School of Medicine	6	2
Howard University College of Medicine	3	-
Florida		
University of Florida College of Medicine	7	1
University of Miami School of Medicine	6	1
Georgia		
Emory University School of Medicine	3	3
Illinois		
Northwestern University Medical School	16	8
Stritch School of Medicine of Loyola Univ.	3	-
The Chicago Medical School	1	-
University of Chicago School of Medicine	8	4
University of Illinois College of Medicine	13	1
Indiana		
Indiana University School of Medicine	3	3
Iowa		
State University of Iowa College of Medicine	2	-
Kansas		
University of Kansas School of Medicine	3	3
Kentucky		
University of Louisville School of Medicine	5	1
Louisiana		
Louisiana State Univ. School of Medicine	2	-
Tulane University School of Medicine	3	2
Maryland		
Johns Hopkins Univ. School of Medicine	36	14
University of Maryland School of Medicine	8	1

Schools - continued	Applicants	Appointees
Massachusetts		
Boston University School of Medicine	9	3
Harvard Medical School	69	26
Tufts University School of Medicine	8	1
Tufts Univ. School of Dental Medicine	1	-
Michigan		
University of Michigan Medical School	7	1
Minnesota		
University of Minnesota Medical School	3	2
Mississippi		
University of Mississippi Sch. of Medicine	1	-
Missouri		
St. Louis University School of Medicine	2	-
University of Missouri School of Medicine	2	-
Washington Univ. School of Medicine	16	5
Nebraska		
Creighton University School of Medicine	1	-
University of Nebraska College of Medicine	1	1
New Hampshire		
Dartmouth Medical School	1	1
New Jersey		
New Jersey College of Medicine	3	1
New York		
Albany Medical College	5	2
Albert Einstein College of Medicine	27	10
Columbia Univ. College of P & S	24	7
Cornell University Medical College	18	8
New York Medical College	2	-
New York University School of Medicine	30	16
State Univ. N.Y., Downstate Med. Center	32	7
State Univ. N.Y., Upstate Med. Center	11	1
State Univ. N.Y., at Buffalo Sch. of Med.	12	3
Univ. of Rochester Sch. of Med. & Dentistry	9	4
North Carolina		
Bowman Gray School of Medicine	3	1
Duke University School of Medicine	22	10
University of North Carolina Sch. of Med.	5	1
Ohio		
Ohio State University College of Medicine	13	2
University of Cincinnati College of Med.	3	-
Western Reserve University Sch, of Med.	19	5
Oklahoma		
University of Oklahoma School of Medicine	4	2
Oregon		
University of Oregon Medical School	3	-

Schools - continued	Applicants	Appointees
Pennsylvania		
Hahnemann Medical College	7	1
Jefferson Medical College of Philadelphia	13	1
Univ. of Pennsylvania School of Medicine	42	15
University of Pittsburgh Sch. of Medicine	8	3
Tennessee		
University of Tennessee College of Med.	1	-
Vanderbilt University School of Med.	6	2
Texas		
Baylor University College of Medicine	9	2
Univ. of Texas School of Medicine	2	-
Univ. of Texas Southwestern Med. Sch.	1	1
Utah		
University of Utah College of Medicine	7	3
Vermont		
University of Vermont College of Medicine	3	2
Virginia		
Univ. of Virginia Medical School	6	1
Washington		
Univ. of Washington School of Medicine	2	1
Wisconsin		
Marquette University School of Medicine	4	-
Univ. of Wisconsin Medical School	3	2
Dalhousie University, Halifax, Nova Scotia	1	-

Table 3. Tabulation of Hospitals Providing Internship Training For Current Candidates and Appointees

Hospitals	Applicants	Appointees
Alabama		
St. Vincent Hospital	1	-
Univ. Hospital & Hillman Clinic	2	-
California		
Children's Hospital of Los Angeles	2	-
H. C. Moffitt Hospital	5	1
Hospital of the Good Samaritan, L.A.	1	-
Kaiser Foundation Hospital, L.A.	1	-
Los Angeles County General Hospital	6	1
Los Angeles County Harbor Gen. Hosp.	2	-
Memorial Hospital of Long Beach	1	1
Mercy Hospital, San Diego	1	1
Mount Zion Hospital, S.F.	3	1
Palo Alto-Stanford Hospital Center	10	5
Presbyterian Medical Center,S.F.	1	-
U.S. Public Health Service Hospital,S.F.	1	1
San Francisco General Hospital	3	-
Univ. of California Hospitals, L.A.	13	4
Univ. of California Hospitals, S.F.	10	3
Univ. of California Hospital, San Diego	1	-
Wadsworth VA Hospital, Los Angeles	2	1
Colorado		
University of Colorado Medical Center	6	2
Connecticut		
Greenwich Hospital	1	-
Hartford Hospital	3	1
Hospital of St. Raphael	1	-
Yale-New Haven Medical Center	18	9
District of Columbia		
D. C. General Hospital	1	-
Georgetown University Hospital	4	-
George Washington University Hospital	3	1
Florida		
Jackson Memorial Hospital	4	1
Univ. of Florida Teaching Hosp. & Clinics	5	2
Georgia		
Grady Memorial Hospital	4	1
Hawaii		
Queen's Hospital, Honolulu	1	-

Hospitals - continued

	Applicants	Appointments
Illinois		
Children's Memorial Hospital	2	-
Cook County Hospital	2	-
Evanston Hospital	2	1
Michael Reese Hospital	5	-
Passavant Memorial Hospital	2	1
Presbyterian-St. Luke's Hospital	9	2
Univ. of Chicago Hospital & Clinics	7	2
Univ. of Illinois Research & Educational Hosp.	3	-
Indiana		
Indiana University Medical Center	3	2
Iowa		
University of Iowa Hospitals	3	1
Kentucky		
Univ. of Kentucky Medical Center	2	-
Louisiana		
Charity Hospital, New Orleans	2	1
Ochsner Foundation, New Orleans	1	1
Maryland		
Baltimore City Hospital	1	-
Church Home Hospital, Baltimore	1	-
Johns Hopkins Hospital	33	16
U.S. Public Health Service Hospital	1	-
University of Maryland Hospital	2	-
Sinai Hospital of Baltimore	1	-
Massachusetts		
Beth Israel Hospital	10	3
Boston City Hospital	28	7
Children's Hospital Medical Center	4	2
Massachusetts General Hospital	28	17
New England Center Hospital	2	-
Peter Bent Brigham Hospital	15	5
University Hospital, Boston	3	-
St. Elizabeth's Hospital	1	-
Michigan		
University Hospital, Ann Arbor	4	-
Minnesota		
St. Mary's Hospital, Duluth	1	-
Univeristy of Minnesota Hospital	8	4
Mississippi		
University Hospital, Jackson	1	-
Missouri		
Barnes Hospital	17	5
Jewish Hospital of St. Louis	4	1

Hospitals - continued

	Applicants	Appointments
New Hampshire		
Mary Hitchcock Hospital	1	-
New Jersey		
Newark Beth Israel Hospital	1	-
West Jersey Hospital, Camden	1	-
New York		
Albany Medical Center Hospital	4	1
Albert Einstein Medical Center	1	1
Bellevue Hospital	18	8
Beth Israel Hospital	2	-
Brookdale Hospital Center	1	-
Bronx-Lebanon Hospital	1	-
Bronx Municipal Hospital Center	23	9
Buffalo General Hospital	3	1
Children's Hospital of Buffalo	1	-
Edward J. Meyer Memorial Hospital	1	-
Genesee Hospital, Rochester	4	2
Kings County Hospital Center	12	2
Long Island College Hospital	1	-
Long Island Jewish Hospital	4	-
Maimonides Hospital	2	1
Montefiore Hospital	5	1
Mount Sinai Hospital	14	5
New York Hospital	20	11
North Shore & Memorial Hospital	1	-
Presbyterian Hospital	16	9
U.S. Public Health Service Hospital	2	-
Rochester General Hospital	1	-
Rochester St. Mary's Hospital	1	-
Roosevelt Hospital	5	1
State Univ. N.Y., Upstate Med. Center	1	-
St. Luke's Hospital	1	1
Strong Memorial Hospital	5	-
VA Hospital, Brooklyn	1	-
North Carolina		
Duke University Hospital	20	9
North Carolina Baptist Hospital	2	-
North Carolina Memorial Hospital	4	1
Ohio		
Cincinnati General Hospital	7	1
Cleveland Metropolitan General Hospital	8	5
Kettering Memorial Hospital	2	1
Mount Sinai Hospital of Cleveland	2	-
University Hospital, Columbus	6	-
University Hospitals of Cleveland	22	6
Oregon		
Good Samaritan Hospital	1	1
University of Oregon Hospital	3	1

Hospitals - continued

	Applicants	Appointees
Pennsylvania		
Abington Memorial Hospital	1	-
Albert Einstein Medical Center	1	1
Children's Hospital of Pittsburgh	1	-
Children's Hospital, Philadelphia	2	1
Hospital of the Univ. of Pennsylvania	24	10
Jefferson Medical College Hospital	3	-
Pennsylvania Hospital	1	-
Philadelphia General Hospital	1	1
Presbyterian Hospital, Philadelphia	1	-
Presbyterian-University Hospital, Pittsburgh	5	-
Temple University Hospital	1	1
Rhode Island		
Rhode Island Hospital	3	1
Tennessee		
Vanderbilt University Hospital	8	2
Texas		
Baylor University Hospital	1	-
Ben Taub General Hospital	4	-
Methodist Hospital, Houston	1	-
Parkland Memorial Hospital	1	1
Utah		
University of Utah Affiliated Hospitals	5	-
Vermont		
Mary Fletcher Hospital	1	-
Virginia		
Medical College of Virginia Hospitals	3	1
University of Virginia Hospital	1	-
Washington		
King County Hospital	7	3
University of Washington Hospital	5	3
Wisconsin		
Milwaukee County General Hospital	1	-
University Hospitals	2	-
Dalhousie University Hospital	1	-
Gorgas Hospital, Panama Canal Zone	1	1

Appendix I. Schedule for Clinical, Research and Staff Associate Matching Program

Calendar Year 1968
(Appointments Beginning July 1970)

April 19	Deadline for receipt of completed applications
May 17	Final date for review of applications by Institutes
June 10 thru June 28	Scheduled interviews with candidates
July 1 thru July 5	Selection of appointees by Institutes
July 9	Matching
July 11	Institutes notified of results of matching
July 12	Inter-Institute negotiations
July 15	Telephonic notification to successful candidates of selection for appointment
July 16 thru July 26	Notification by Clinical & Professional Education to unsuccessful candidates; release of unsuccessful candidates for recruiting by other programs; notification to Office of Personnel, PHS, regarding actions taken on all candidates.

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DEPARTMENT OF DIAGNOSTIC RADIOLOGY

CC-26
Serial No.

TABLE OF CONTENTS

Accomplishments..DR-1

Contributions to Research Programs..................................DR-3

Major Problems Encountered..DR-6

Changes and Improvements Made.......................................DR-8

Proposed Future Objectives..DR-9

Honors and Awards DR-10

Publications..DR-10

Tables:
1. Number of X-ray Examinations, FY 1968...........................DR-13
2. Comparison of Activity, FY 1967 and 1968........................DR-14

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DEPARTMENT OF DIAGNOSTIC RADIOLOGY

CC-26
Serial No.

ACCOMPLISHMENTS

The major accomplishment of the Department of Diagnostic Radiology during fiscal year 1968 was the provision of a complete diagnostic radiological service for Clinical Center patients; an emergency X-ray service and a routine chest X-ray facility for all of the NIH employees; and a chest X-ray interpretation service for employees of the Rocky Mountain Laboratory at Hamilton, Montana.

There were 44,777 X-ray examinations performed on 26,462 patients which included 1405 special diagnostic X-ray studies utilizing contrast materials and catheters to study various organ structures of the body (Table 1). There was a slight decrease in the volume of activity compared with 1967 (Table 2). Two factors affecting the workload during the year were the decrease in new employees entering on duty at NIH and our renovation-equipment installation program. Approximately 600 X-ray studies per month were performed on employees of which at least 40% are new employees or applicants. The inactivation of X-ray rooms for the installation of new equipment within the Department decreased the volume of special studies somewhat but had no particular influence on the volume of basic examinations. An average of 30 special studies per week was near our maximum prior to the recent development of a neurovascular diagnostic room which permits an increase in the volume of these studies. The extent of the increase will be limited only by the available manpower as the average special study requires a five man team for 1½ hours as well as 4-6 man hours preparing the room, trays and equipment before the procedure and clean up afterwards.

Our staff made significant contributions to many professional conferences and programs throughout the year. As regular contributions, Dr. Betty Hathaway presents a monthly teaching conference on congenital heart disease for the Radiology Department at the Bethesda Naval Hospital; Dr. John Doppman conducts a monthly peripheral vascular conference for the staff and resident radiologists at Johns Hopkins Hospital; and Dr. Jean Herdt contributes his services to the weekly NCI lymphoma staging conference. Other contributions include:

1. Dr. Jean Herdt presented the radiological aspects for the NCI Grand Rounds, "Multidisciplined Approach to the Staging of Hodgkin's Disease" on 1/12/68.

2. Dr. Jean Herdt gave a demonstration of the technique of gynecography for the radiology staff at Prince Georges' General Hospital in August 1967, and at the Columbia Hospital for women in May 1968.

3. Dr. John Doppman presented a paper and an exhibit "Prevention of Radiation Nephritis with Renal Artery Infusion of Vasoconstrictive Agents" at the 53rd annual meeting of the Radiological Society of North America in November 1967 in Chicago.

4. Dr. John Doppman presented an exhibit "Selective Arteriography of the Spinal Cord" at the 68th annual meeting of the American Roentgen Ray Society in Washington, D. C., in September 1967, and also at the 53rd annual meeting of the Radiological Society of North America held in Chicago in November 1967.

5. Dr. Thomas A. Freed presented a paper, "Radiographic Findings in Extracardiac Vascular Injury Secondary to Blunt Chest Automobile Trauma," at the 53rd annual meeting of the Radiological Society of North America in Chicago in November 1967, and was one of the authors of another paper, "Point Source Irradiated Canine Kidney; Angiographic and Histologic Evaluation," presented at this same meeting. There was an exhibit associated with the latter paper.

6. Dr. Martin L. Silbiger presented a paper, "Neuromuscular Disorders Affecting the Pharynx," at the 53rd annual meeting of the Radiological Society of North America in Chicago in November 1967.

7. Mr. Joseph Morel was a guest speaker and presented "Tomography: A Review of Principles, Methods and Radiographic Results" at the Symposium for Radiologic Technologists sponsored by the Oregon Society of Radiologic Technologists in Portland in February 1968.

8. Mr. Joseph Morel was the program chairman of the Mid-Eastern Conference of Radiologic Technologists held in Washington, D. C., November 10-12, 1967.

9. Mr. Joseph Morel presented a graduate technicians seminar on "The History of Grids and Application in Radiology" at the Central Section of the Pennsylvania State X-ray Technologist Society held at the Harrisburg General Hospital in March 1968.

Appointments made during the year included the Chief of the Department as the liaison officer for the USPHS and the Radiological Society of North America and Dr. John Doppman as a member of the Radiation Committee and the NIH Committee of the Office of Equal Opportunity.

Many foreign and domestic visitors were received during the year. The foreign countries represented included England, France, Japan, Czechoslovakia, Scotland, Ghana, Canada and Israel. There were radiologists and X-ray technologists who spent 1-5 days observing procedures as performed here and subsequently utilizing them in their own hospitals. Some are interested only in the utilization of advanced equipment such as our polytome or in the organization of our special studies room. The latter has been of particular interest to several local radiologists who are in the process of installing their first special studies room or suite such as at Georgetown University Hospital, the Washington Sanitarium and Hospital, the Bethesda Naval Medical Center and Fairfax Hospital. Other types of visitors include high school counselors for health careers and medical record librarian trainees.

We have continued to select one radiologist per year who wishes to become an expert in diagnostic cardiac, neurological and peripheral vascular studies. These men have become the special studies radiologists at other institutions after completion of this additional year and thus raised the available quality of patient care in the medical community. Very few training centers actually provide this training. It may be listed as a component of residency training, but, in fact, quite frequently very little training is achieved.

CONTRIBUTIONS TO RESEARCH PROGRAMS

Contributions to research programs by the department are many and varied. Information obtained from most X-ray examinations provides a pertinent part of the Institutes' research investigational studies. Our continuous efforts to attain the highest quality and widest range of X-ray studies provides the greatest yield of information and the best sequential record of research information on patients.

Technical advances, new and improved equipment and a very capable staff have resulted in progress in special diagnostic X-ray studies which have opened many new vistas of information to the research investigators. The selective placement of intravascular catheters in many organs, organ structures and vascular complexes permits visualization of these areas with contrast materials but also provides a method of collecting blood and fluids for assays of hormones, chemicals and cells. In particular, the Endocrinology Service of NCI has been quite excited with the opportunity these studies provide for them to assay the hormone levels near the pituitary gland, testicles, ovaries, kidneys and adrenal glands. Current new investigations based on these radiological skills include:

1. Catheterization and contrast studies of the testicular and adrenal veins to localize the undescended testicle before surgery or after unsuccessful surgery. Also, sampling from these veins under normal and pathological conditions is performed to study dynamic physiology.

2. Catheterization and contrast studies of the cavernous sinus for evaluation of pituitary gland abnormalities, assays of venous blood for physiological studies, and establish normal values for the cavernous sinus.

3. Catheterization and contrast injection of the ptergoid plexus of veins to evaluate for posterior extension of neoplasms of the maxillary sinuses and to document normal anatomy.

4. Retrograde azygous vein catheterization and contrast injection as a potential method for detecting posterior mediastinal lymph node enlargement in patients with mediastinal adenopathy usually secondary to disseminated lymphoma.

5. Arteriographic evaluation of peripheral arterial changes in Raynaud's phenomena and the collagen vascular diseases pre-and post therapy.

A rewarding project of continuing interest is the localization of parathyoid adenomata by selective inferior thyroid arteriography. Recently, retrograde catheterization of the inferior thyroid vein has been added to the study because the veins are profuse over the posterior surface of the thyroid and may be displaced by a small adenoma before significant arterial displacement may occur. Venous blood samples are assayed for thyrocalcitomin and parathormone. These vessels are quite small and are thus difficult to selectively enter with a catheter and demonstrates the importance of having advanced X-ray equipment and also the time and personnel required to support the volume of special studies that are provided for the patients here.

A technique was divised by Dr. John Doppman for localizing the renal artery branch causing renal infundibular compression and pain. The technique utilizes the placement of small opaque catheters or guide wires in the offending renal artery branches which are subsequently surgically corrected.

An investigation of the ear ossicular changes in rheumatoid arthritis was initiated. This study was made possible by the recent addition of the most advanced tomographic X-ray machine, the polytome, which can demonstrate the finest details of the middle ear.

Research by review projects which are in process and of clinical significance include:

1. Review of lymphoma staging procedures in 200 patients to evaluate the accuracy of radiographic procedures and reporting; the unusual radiographic manifestations of lymphoma; the correlation between biopsy studies and the lymphangiogram; and the radiographic evaluation of complications of radiation therapy---cardiac, pulmonary and gastrointestinal.

2. Review of the post-irradiation sella turcica to evaluate the degree of remineralization and the significance of this change.

3. Correlation of cerebral blood flow patterns as they pertain to cerebral dominance.

4. Review and evaluation of opportunistic fungus injections of the lungs.

5. Study of the incidence of detectable, significant change in heart size following anterior mediastinal radiation therapy.

Research studies of a more basic nature include:

1. A post mortem comparative study of the myelographic findings on the posterior surface of the spinal cord with the dissection identification of anatomic structures. As radiographic equipment and techniques become more sophisticated, new detail is seen which may present problems as to whether the findings are normal or of pathological significance, thus, such a study is of significant value to clinical radiology.

2. A study in monkeys on the effect of acute gastric dilatation on the inferior vena cava. This investigation suggests that the shock state associated with acute gastric dilatation is probably due to compression of the inferior vena cava with subsequent reduction in cardiac output.

3. A technique for the opacification of the anterior spinal artery is being evaluated in monkeys for possible later use in patients.

4. A study of the effect of intra-arterial amphotericin on fungus meningitis in monkeys.

5. Evaluation of the effect of fractional focal spot X-ray tubes on detail in various X-ray studies.

6. Preliminary investigation of image storage possibilities of radiographic exposures with emphasis on instant viewing of tomographic images.

7. From a collaborative project involving our cardiovascular radiologist and the NHI, a most valuable electronic device was developed which permits a quantitative evaluation of the amplitude of pulsations of the heart utilizing a television recording method and an analog computer. The result is called heart motion video tracking. This device has been most helpful in the diagnosis of congenital and acquired heart disease, as well as in the post operative evaluation of the heart.

8. A collaborative project with the Goddard Space Agency to evaluate the feasibility of magnetizing radiographic opaque contrast materials and directing them in the human body by means of external magnets. Also, evaluate as to whether a magnetic tipped intravascular catheter could be directed by magnets external to the body.

In addition to the primary and collaborative contributions to research by our staff, we provide certain basic research services, such as an animal diagnostic X-ray facility where routine animal X-ray studies and specimen radiography are performed as a service for various laboratories of the Institutes. Studies requiring the surplus image intensified fluoroscopy unit in this facility require a collaborative venture with a radiologist. Also, as a service, we develop autoradiograms for some of the laboratories who have no developing facilities.

Consultative services are made available, as time permits, for the evaluation of the content of government patent requests and for research grant applications when these have reference to radiology. The latter have been less frequent since the research grants group has acquired a radiologist. The Chief of the Department has served for the past four years as a member of an NCI diagnostic research grants committee although few applications involve radiology. Members of the department also occasionally serve as reviewers for papers submitted to the Journal of the NCI.

MAJOR PROBLEMS ENCOUNTERED

Certain problems are chronic such as staffing, equipment failure, and unpredictable variations in workload. The greatest problem in staffing relates to the difficulties due to lack of flexability in the civil service system. Because of the transient nature of hospital personnel, we may have as many as five or six technicians resign over a period of a few weeks making it extremely difficult to provide required services in the Department. Then begins the problem with 1½ to 2 weeks utilized in getting a civil service register containing 6 to 8 names. Usually 60% of the list are unavailable and many of those who are available are undesirable because of previous below average to poor work records or attitude problems. To obtain a second list of names is another 1½ to 2 weeks. If, in the meantime one finds a capable, desirable technician who, for some reason or other, is moving to this area and tries to get them hired, the time involved is immense. In fact, they usually take another job because they cannot wait the month or six weeks.

Equipment failure has persisted as a major problem despite our almost complete replacement of obsolete equipment during the past year. Standard X-ray equipment is essentially trouble free; however, the special procedure equipment with intricate electronic components will function optimally only 50% of the time. Although the image intensified fluoroscopy X-ray units with television monitoring and movie camera attachments have been on the market for the past 10 years, there is a considerable knowledge gap on how to get optimum function from them. There are men who are skilled in television and men skilled in X-ray equipment maintenance and repair but the defect in ability arises in the communal areas of these two systems. For the past year, a contract for maintenance and repair of three of these units was in effect with one of the large manufacturers but there was little evidence that the equipment functioned better than before. We feel that, as a final attempt to solve this dilemma, we should try to employ our own repair man on a one year trial basis. The cost would be less than other methods and hopefully would result in improvement.

The unpredictability of workload is a greater problem with special study procedures than with routine radiography. Most of these studies require a 5 member team for an average period of 2 hours. One member is a nurse who has an additional time investment in setting up for the study and performing follow-up details after the study is completed. Recently we have been able to have only two nurses available from the outpatient service due to their shortages and workloads. This limits us to four special procedures per day. We have reassessed the need for nurses for certain procedures and, with the agreement of the Chief of the Nursing Service, have decreased the required nurse coverage for some.

The turnover rate of X-ray technicians in the Department was 50% this year while the overall rate for the staff was 25%. Some leave to go to school, get married, have children, or other significant reasons but about 30% leave for fairly trivial reasons. At least 3 of our losses were encouraged to leave because of unsatisfactory work records. Two of these were typists with investments of several months time in training them. There is also a considerable loss in training time for technicians related to the turnover rate as all new technicians require some orientation to our equipment and techniques. A minimum of one month of training is necessary for the more complicated special procedure studies in the Department as well as for the 10A and 7th floor heart catheterization laboratories. Training time could be decreased by 75% if we could maintain a stable staff.

Having satellite X-ray facilities is inefficient with respect to personnel and equipment. The personnel time is never fully utilized and the loss is doubled when a second technician is in the process of being trained in these areas. A darkroom technician is assigned to the 10A heart catheterization area and there are two X-ray film processing units which are in use only 50% of the time.

A very major problem of considerable future significance is the inability to attract permanent staff radiologists at the present limited salary schedule which is quite dwarfed when compared with the national median gross income of $31,300 in 1966 for radiologists. This survey was reported in Hospital Physician in December 1967. Should any changes occur which would decrease or delete the Clinical Associate Program, we would be in serious difficulty. In this event, even if one tried to solve the problem by returning to a residency training program, there would be little relief as residency applications to the USPHS have markedly decreased. The income level for residents has increased in hospital training programs in civilian hospitals in recent years and this plus the required pay back time has made the service less desirable. Although NIH does not require the pay back time, this may not be generally known. A minimum salary of $28,000 should be made available for radiologists at NIH. One could then gradually acquire a high quality, relatively permanent staff in this specialty and gradually decrease Cord-deferred radiologists so that when the time arrives that this source becomes non-existent, there will be a radiology staff of the quality required by NIH.

There is a continued need for a storage space of at least 20 x 20 feet for X-ray accessories, equipment, and equipment parts which we must keep on hand for current, intermittent, and future use. These pieces are now kept in the diagnostic X-ray rooms, halls, offices or wherever they may be placed. Examples of these items and the approximate value include X-ray tubes ($1900), television camera chains ($2500), special X-ray tables and tube mounts ($8000), portable tomographic equipment ($8500), extra parts for X-ray film processors ($1200), extra power injectors ($3500), and occasionally used accessories for special procedures ($6000). These items are delicate and cannot be housed and handled in the usual warehouse storage situation.

The installation of new equipment and preparatory renovations were in process in the Department throughout the year. For a period of 6 weeks, 3 of our 11 examination rooms were non-functioning. At times, it was quite difficult to accomplish the daily workload; however, due to the fine attitude of our staff, there was minimal back up of studies.

CHANGES AND IMPROVEMENTS MADE

Four diagnostic X-ray rooms were completely renovated and new equipment installed. Two rooms were changed in function and equipped with some new and some on-hand equipment. This completes our basic equipment replacement program except for one room in the department and the 10A heart catheterization laboratory. The two new rooms established included a neurodiagnostic room in a previous conference room and a lymphangiogram room from one of our previous animal X-ray rooms. The neurodiagnostic room, which has just opened, will permit all special neuroradiological procedures to run continuously with no scheduling problems except those related to available nurse coverage. Previously, three rooms were being used for neurological procedures which was quite inefficient. For several years the NINDB has intermittently requested an automatic X-ray processing unit for their 10A operating suite. It was difficult to justify the cost of purchasing and maintaining such a unit there because of the paucity of procedures requiring the unit such as one to two studies per month. We found that we could make a processing unit portable and can use it most of the time in our new neurodiagnostic room but have it on the job when needed for those few occasions in the 10A neurosurgical suite.

The lymphangiogram room has been most helpful as these studies are quite prolonged, 2-3 hours, and previously tied up a general purpose X-ray room. The previous animal X-ray room was connected with the department by making a door into the north hall. Portable X-ray equipment is utilized for taking the films and a C-arm mobile image intensified fluoroscopy unit is used to follow the progress of the contrast material in the lymphatic vessels and nodes.

Of the new equipment installed, a Philips-Massiot Polytome has produced most spectacular results. Presently, there are only 20 of these units in the country, although the number is slowly increasing. This is a tomographic unit which allows 5 different tomographic motions producing equivalent varying results. The finest bone detail is now provided for study. As an example, the ossicles and other delicate structures of the middle ear can be visualized with amazing clarity. The cuts of structures may be as fine as one millimeter.

Several pieces of general equipment which have improved our function include a new Apeco office copying machine, a microfilming unit, a heavy duty X-ray film punch, and an automatic typing unit. The copying machine has decreased copying time by 30%; the microfilming unit will in the near future begin to free some film storage space; the X-ray punch has decreased preparation time for special studies by 50%; and the autotypist has decreased typing time by 25%.

By modification, we were able to make one of our Schonander rapid serial X-ray film changers portable. This was a rather complicated task but now this unit may be rolled in a room to replace one which becomes malfunctioning when previously such a problem would have stopped a study. Also, this unit may be used, as needed, in the new neurodiagnostic room. The cost of these units is $26,000 so this modification has saved the purchase of a new unit for this room.

The patient waiting areas were considerably improved by being included in the art for patients program conducted by Mrs. Luther Terry. Also, improved lighting made the fluoroscopy waiting area far more cheerful.

In a period of one month, our film library clerks with the assistance of the Transportation Section employees moved 80,000 X-ray film jackets from our old storage area on B1 to our new storage area on B2L where we should have adequate and quite attractive film storage space for at least another 2 years. Hopefully, our microfilming program will prolong this time period.

An unused patient dressing room area was converted into a two-party typing room. This was an improvement over their previous cramped quarters and, more importantly, provided the proper setting for training new typists who need considerable supervision and assistance while they are learning new terminology and getting used to using a dictaphone system.

An extra air conditioning system was installed in our primary special procedures room which was previously so hot that even the patients were perspiring. Much of the heat was produced by the accessory equipment required for these studies as well as the number of people (5-7) in the room.

PROPOSED FUTURE OBJECTIVES

The foremost future objective is to continue providing the most advanced and efficient diagnostic radiological services for the patients of the Clinical Center in the most attractive and comfortable environment attainable. This necessitates constant evaluation and improvement of techniques and methods through awareness of the latest developments in the field and continued efforts to attract and retain high quality staff.

It is hoped that we will finish our planned replacement of obsolete equipment which would involve one more room in the department and the 10A heart catheterization laboratory. Following this, we have planned to partially replace our standard X-ray generators with constant potential generation which will permit the use of much shorter radiation times, thus decreasing exposure to the patients and also permitting the use of much higher kilovoltage.

As time permits with respect to patient care duties, every effort will be devoted to the pursuit of research opportunities for our staff as well as the extra-patient radiological research needs of other NIH investigators.

Some thought has been given to the possibility of an X-ray facility in the Admissions and Follow-Up area. Although this would be a less efficient operation from our standpoint, it would increase the efficiency of the clinic and certainly provide more comfort and convenience for the patients. The X-ray studies could then be done at the discretion of the nurse in charge while the patients are waiting to be seen.

HONORS AND AWARDS

Dr. John Doppman continued as the assistant editor of the journal, Investigative Radiology, and as book reviewer for the Journal of the American Medical Association.

Awards received by members of our staff during the year include:

1. Honorable mention award for the exhibit, Prevention of Radiation Nephritis with Renal Artery Infusion of Vasoconstrictive Agents, presented at the 53rd annual meeting of the Radiological Society of North America in Chicago, November 1967, by Dr. John Doppman.

2. Certificate of Merit award for the exhibit, Selective Arteriography of Spinal Cord Arteriovenous Malformation, presented at the 68th annual meeting of the American Roentgen Ray Society in Washington, D. C., September 1967, by Dr. John Doppman.

3. Second prize award for the exhibit, A Different Approach to Radiographic Positioning, presented at the annual Mid-Eastern Conference for Radiologic Technologists held in Washington, D. C., in November 1967, by Mr. Neil French.

PUBLICATIONS

Twenty six publications authored or co-authored by the 10-member radiologist staff of the department for the fiscal year 1968 include:

Bosher, L.H., Jr., and Freed, T.A.: The surgical treatment of traumatic rupture or avulsion of the innominate artery. J. Thorac. Cardiovasc. Surg. 54: 732-739, Nov. 1967.

Carbone, P.P., Zipkin, I., Sokoloff, L., Frazier, P., Cook, P., and Mullins,F.: Fluoride effect on bone in plasma cell myeloma. Arch. Intern. Med. 121: 130-140, Feb. 1968.

Doppman, J.L.: Arteriographic identification of spinal cord blood supply prior to aortic surgery. JAMA 204: 174-175, Apr. 1968.

Doppman, J.L.: Roentgenogram of the month. Dis. Chest 53: 349-350, Mar. 1968.

Doppman, J.L., Di Chiro, G., and Glancy, D.L.: Collateral circulation through dilated spinal cord arteries in aortic coarctation and extraspinal arteriovenous shunts. An arteriography study. Clin. Radiol. 1968. In press.

Doppman, J.L., Di Chiro, G., and Ommaya, A.K.: Obliteration of spinal-cord arteriovenous malformation by percutaneous embolisation. Lancet 1: 477, Mar. 1968.

Doppman, J.L., Di Chiro, G., and Ommaya, A.K.: Selective Arteriography of the Spinal Cord. St. Louis, Warren Green, Inc., 1968. In press.

Freed, T.A., and Bosher, L.H., Jr.: Arteriographic demonstration of laceration of great vessels secondary to blunt chest trauma. Radiology 90: 88-89, Jan. 1968.

Freed, T.A., Duncan, K., and Vinik, M.: Angiographic roll previewer. Radiology 89: 340, Aug. 1967.

Freed, T.A., Neal, M.P., Jr., and Vinik, M.: Radiographic findings in extracardiac vascular injury secondary to blunt chest automobile trauma. Amer. J. Roentgen. 1968. In press.

Freed, T.A., Neal, M.P., Jr., and Vinik, M.: The effect of bradykinin on renal arteriography: experimental observations. Amer. J. Roentgen. 102: 776-782, Apr. 1968.

Freed, T.A., and Vinik, M.: Effect of acetylcholine on renal arteriography: preliminary observations. Invest. Radiol. 3: 81-85, Mar.-Apr. 1968.

Freed, T.A., and Vinik, M.: Mobile radiation protection barrier for use in arteriography. Amer. J. Roentgen. 101: 981-982, Dec. 1967.

Greenspan, R.H., Simon, A.L., Ricketts, H., and Watson, J.: In vivo magnification angiography. Invest. Radiol. 2: 419-431, Nov.-Dec. 1967.

Johnson, R.E., and Cook, P.L.: Hodgkin's disease; the negative lymphogram in guiding radiotherapy. Amer. J. Roentgen. 102: 883-890, Apr. 1968.

Johnson, R., Doppman, J.L., Horbert, J.C., Steckel, R.J., and MacLowry, J.D.: Prevention of radiation nephritis with renal artery infusion of vasoconstrictive agents. Radiology. 1968. In press.

Peterson, C.C., Jr., and Silbiger, M.L.: Five ureters - a case report. J. Urol. 1968. In press.

Peterson, C.C., Jr., and Silbiger, M.L.: Reiter's syndrome and psoriatic arthritis: their roentgen spectra and some interesting similarities. Amer. J. Roentgen. 101: 860-871, Dec. 1967.

Schuette, W.H., and Simon, A.L.: A new device for recording cardiac motion. *Med. Res. Engin.* 1968. In press.

Schuette, W.H., and Simon, A.L.: An electronic heart motion tracking system. *Institute of Electrical and Electronics Engineers.* 1967 International Convention Record.

Silbiger, M.L., and Donner, M.W.: Morphine in the evaluation of gastrointestinal desease: a cineradiographic study. *Radiology.* 1968. In press.

Silbiger, M.L., Scott, S., Morrow, A.G., and Simon, A.L.: Correlation of chest roentgenograms and hemodynamic findings following surgical closure of secundum atrial septal defects. *Radiology.* 1968. In press.

Silbiger, M.L., Scott, S., Morrow, A.G., and Simon, A.L.: Correlation of chest roentgenograms and hemodynamic findings following surgical repair of ventricular septal defects. *Radiology* 90: 90-93, Jan. 1968.

Silbiger, M.L., Pikielney, R., and Donner, M.: Neuromuscular disorders affecting the pharynx. *Invest. Radiol.* 2: 442-448, Nov.-Dec. 1967.

Simon, A.L., Ross, J., Jr., and Gault, J.H.: The angiographic anatomy of the left ventricle and mitral valve in idiopathic hypertrophic subaortic stenosis. *Circulation* 36: 852-867, Dec. 1967.

Smellie, W.A.B., Vinik, M., Freed, T.A., and Hume, D.M.: Pertrochanteric venography in evaluation of renal transplant recipients. *Surg. Gynec. Obstet.* 126: 777-780, Apr. 1968.

Table 1

Number of X-ray Examinations

Fiscal Year 1968

	Patients	X-ray Examinations	Examinations per Patient
Inpatients	14, 347	26, 735	1. 86
Outpatients	5, 233	11, 019	2. 11
EHS	6, 882	7, 023	1. 05
Total	26, 462	44, 777	

Table 2

Comparison of Activity

Fiscal Years 1967 and 1968

	3/31/66 - 3/31/67	3/31/67 - 3/31/68	Change
Total number of patients examined	26, 747	26, 462	- 285
Total number of X-ray examinations	45, 867	44, 777	-1, 090
Number of X-ray examinations per patient	1. 71	1. 69	- .02
Total number of X-ray special procedures	1, 719	1, 405	- 314

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

EMPLOYEE HEALTH SERVICE BRANCH

CC-12
Serial No.

TABLE OF CONTENTS

Occupational Medicine at the Crossroads. . . . . EH- 1

Treatment of On-the-Job Illnesses and Conditions Requiring Emergency Attention. . . . . EH- 2

Pre-employment and Other Examinations. EH- 3

Referral of Employees to Private Physicians and Dentists. . . . . EH- 5

Preventive Medicine Programs. . . . . EH- 5

Administration Considerations. . . . . EH- 8

Publications. . . . . EH- 9

Table I. Selected Statistics. EH-10

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

EMPLOYEE HEALTH SERVICE BRANCH

CC 12
Serial No.

OCCUPATIONAL MEDICINE AT THE CROSSROADS

Public Law 658 of the 78th Congress, with further details spelled out in Budget Bureau Circular A-72, issued in 1966, authorizes Federal Employee Health Services in four general program areas.

1. Treatment of on-the-job illnesses and conditions requiring emergency attention.
2. Pre-employment and other examinations.
3. Referrals of employees to private physicians and dentists.
4. Preventive programs relating to health.

At the highest levels of government, there is clear-cut support for the principles of Occupational Medicine, as evidenced by President Johnson's statements that "Good health and good work go together" and that it is "important to provide for a strong preventive health program." President Johnson continued, "We must be prepared, to the best of our ability, to assure our employees of prompt attention to on-the-job illness and injury, correction of working conditions that may be detrimental to employees' health, education in health maintenance, health examinations, including in-service examinations as needed, and disease screening examinations and immunizations." Emphasis, quite appropriately, is now being placed on preventive medicine rather than therapeutic medicine.

In spite of budgetary restrictions, space deficiencies and personnel ceilings, we have, nevertheless, quietly attempted to improve the preventive medical aspects of our program. The details of our efforts will be outlined in a later section of this report. However, we did not, nor did we expect to, achieve any dramatic results. Although a relatively low level of understanding of our activities in preventive medicine has continued, we are encouraged, almost paradoxically, by the increasing number of complaints and demands that we receive for at least one preventive medical service, the periodic physical examination. Discussed also in greater detail in a later section, we contend that the so-called executive health examination, which is being requested more and more often, is not realistic and would not serve the needs of the overall NIH population. We intend to increase our efforts to develop a comprehensive multiphasic screening-type of periodic health evaluation for all employees which will extend the benefits of preventive medicine to many more staff members than could be covered under an executive health program.

Reorganization and realignment of staff functions, change in general, is the order of the day. Just as the Public Health Service itself is at a significant turning point in its long history, we too feel that we are at a crossroads, from which point we have an unique opportunity to overcome impending stagnation or to proceed down the path of enlightened, yet realistic, preventive medicine. We enlist the support of all levels of management to reach this latter goal as promptly as possible.

TREATMENT OF ON-THE-JOB ILLNESSES AND CONDITIONS REQUIRING EMERGENCY ATTENTION

We continue to regard this as one of our primary areas of responsibility and make every effort to provide the best possible care for injuries and diseases which occur on the reservation. Cooperation with Institute clinicians, and Fire Department and Guard Force personnel has been excellent and there has been no need to change any of our operating procedures. Revised instructions have been issued in the management of burns, although these procedures follow in general the same steps which would be taken in the management of any other serious injury.

Management of work related injuries and illnesses has continued to improve. The present policy of the Bureau of Employees' Compensation in approving area private physicians as BEC designated physicians, to whom we can directly refer work connected injuries, has been very successful. We rarely use the PHS Out-Patient Clinic and have eliminated many complaints we formerly received from employees, many of whom considered visits to the Out-Patient Clinic to be inconvenient and excessively time consuming. During FY1968, two orthopedic surgeons were added to our list of surgeons and internists. All of these physicians use Suburban Hospital, which is very convenient. We have also received permission to refer work-connected eye injuries to area ophthalmologists, thereby reducing the burden on the NINDB Eye Clinic.

Consistent with changing times, there appears to be increasing lenience on the part of the Bureau of Employees' Compensation to accept cases of employees injuries and illnesses as work related. Work injury rates may be inflated inappropriately by this trend.

Transportation of ill or injured employees continued to be one of our more difficult problems. An evaluation of our needs was undertaken during FY 1968 and more clear-cut understandings were developed with the Executive Office and the Admissions and Follow-up area of the Clinical Center. We now have a better understanding of our mutual problems and responsibilities, and can assure that the employee who requires emergency transportation will receive more consistent, and hopefully better, care. The role of the R&W Emergency Transportation Fund was reviewed and clarified.

We continue to remain alert for the early sign or symptom which may suggest exposure to toxic chemicals or microbiological hazards. When on considers the great number of health hazards to which staff members are exposed, we are surprised that we do not see more ill effects than we do from such exposures. Our younger physicians, in particular, are urged to maintain constant vigilance and avail themselves of the opportunities, not only to obtain clinical consultation from the various Institute clinicians, but also to obtain laboratory

studies from the Clinical Pathology Department and the laboratories themselves where the exposed individuals work. All of our physicians take advantage of every possible opportunity to develop, in the professional level, relationships with Institute scientists and clinicians so that consultation and assistance may be obtained promptly when needed.

PRE-EMPLOYMENT AND OTHER EXAMINATIONS

Although we had thought that the rather persistent requests for executive health examinations had abated during the early part of FY 1968, increasing demands for such examinations were received in recent months. The Administrative Review Committee, NIH, composed of key executive officers, directed the NIH Chief of Personnel to investigate the possibilities of obtaining executive health examinations. The Director, CC, and Chief, EHS, both expressed serious reservations about the feasibility of undertaking such a program at this time, primarily because of problems related to budgets, space, impact on diagnostic services, availability of qualified physicians, etc. Although clearly accepting the fact that applying the benefits of preventive medicine at the work place, through the provision of periodic physical examinations, could make significant contributions to the maintenance of health of the management group on whom the organization depends for its continuity and productivity, we believe that greater efforts should be made to develop programs whereby comparable preventive medical services can be offered to all eschelons of staff members at NIH. Given the necessary staff, supporting services and facilities, we are confident that we could provide competent executive health examinations. However, we would much prefer to see a multiphasic screening type of program developed which would enable us to reach the largest possible number of individuals, and in many respects, might be equal in value to the more comprehensive examination. We would propose a program similar to that conducted by the Permanente Foundation, consisting of a detailed medical history, correlated with various laboratory tests and other studies, such as blood pressure, visual and hearing tests, cytology, EKG, etc.

We are indeed gratified to learn that the executive officers are beginning to recognize the value of preventive medicine and hope that they will recognize the value of extending the benefits of preventive medicine to the majority of employees, rather than to the minority as would be served with the so-called executive-type examination.

In any event, we seem to be steering away from the so-called executive-type periodic physical examination to the occupational exposure-type of periodic physical examination. This is an area in which we have a legal responsibility and one in which the periodic physical examination is of great benefit. We have, for example, performed complete periodic physical examinations including, when indicated, proctoscopic examinations and EKG's with Master's Tests, on several occupational groups. The Fire Department and Ground Force personnel were offered periodic examinations because of the necessity for these individuals to be able to respond to emergencies without either endangering their own health or the safety and welfare of others. Grounds Maintenance personnel were offered physical examinations primarily because of the toxic chemicals to which they are exposed, particularly insecticides used in spraying operations. Dr. Earl R. Stadtman's anaerobic chamber research group was offered physical

examinations because of the stresses to which they are exposed. Formula room personnel were offered examinations because of the critical nature of their work in relation to infections control. Lastly, at this time, the Primate Quarantine Unit of Laboratory Aids Branch is being offered perioidc physical examinations because of intimate exposure to sub-human primates, including chimpanzees, which may be a source of B-virus exposures, hepatitis, tuberculosis, and enteric diseases. Providing periodic physical examinations for occupational exposures will probably become one of our most important functions. We are presently completing plans for providing such examinations and other services to the NCI Viral Containment group.

The Civil Service Commission and the Council of Federal Medical Directors for Occupational Health have been active in the past year in the area of examinations, primarily because of current interest in invasion of privacy and other rights as defined by Senator Sam J. Ervin, Jr., and others. Senator Ervin's bill on the Protection of Constitutional Rights has already passed the Senate and a similar bill is expected to pass the House this year. The Civil Service Commission has already reacted, however, and has made permanent its injunction on the use of the self-administered History Form, SF-89. A substitute form is being considered, but it is unlikely that it will be approved. In addition, changes in SF-79, the Pre-employment Physical Form, are also being proposed which may or may not improve its usefulness in medicine. The entire question of confidentiality of medical records, and other information required by governmental health services, is being studied by the Council of Federal Medical Directors for Occupational Health. As President-elect of the Council and as a member of the Committee directed to conduct the study, I can say that it is an extremely difficult problem and one which has many ramifications for the continued successful and rational practice of medicine, not only with government, but also in the private sector.

The Civil Service Commission has also proposed that pre-employment physical examinations be discontinued as a requirement for so-called light duty positions, such as clerical and other office type work. Each agency would be permitted to set its own requirements for pre-employment physical examinations for other positions, basing judgements on the physical requirements demanded by these positions. Physiological demands would evidently be minimized in determining job requirements. We have no serious objection to the principle that many pre-employment examinations for light duty positions may not be necessary. We feel that this is a reasonable approach to reducing physician man-hours spent on performing the thousands of governmental pre-employment physical examinations performed by private physicians, which at best are of dubuous quality.

Examinations for privileged parking for health reasons remain a headache. Efforts have been made to revise procedures to make these examinations more equitable, but such efforts have been met with limited success. At this time, the pendulum seems to be swinging and we are attempting to arrive at our decisions independently without too much reliance upon the findings and recommendations of the individuals private physicians. Hospital summaries and clinic reports are, of course, necessary in many cases, but occasionally are slanted in favor of the employee.

REFERRAL OF EMPLOYEES TO PRIVATE PHYSICIANS AND DENTISTS

Although this heading reflects the language in the basic law, we include in this section our activities which relate to referrals to community resources in general. One of our most difficult problems is assisting the employee who develops serious injury or illness, most often the chronic degenerative diseases which render him medically incapable of performing his duties. Frequently these individuals must retire on disability since it is extremely difficult for them to locate work here at NIH which they are capable of doing. Although difficult to understand, it is a fact that individuals found physically incapable of satisfactorily performing their duties encounter much more difficulty in arranging transfers within NIH than they would if they were applying for a job from the outside. The ready availability of their records evidentally creates some of the difficulties which have been encountered. We have, therefore, had to make greater efforts in assisting these individuals in rehabilitation and retraining. Working with various area offices of vocational rehabilitation, we have had some success, but not as much as we would like. We have, however, continued our interest in this general area and have served on the Maryland Governor's Committee on a Comprehensive Study of Vocational Rehabilitation Services.

Although we have continued to have satisfactory working relationships with private physicians in the area and believe that the overall quality of medical care in the community is good, there appears to be increasing indications that this high quality is becoming rather spotty in nature. Specifically, we have had numerous expressions of concern about the care received at Group Health Association and have had one particular experience with this group, which, in our opinion, did not indicate that the best possible medical care had been given to one of our employees. Subsequent investigation revealed, however, that the individual doctors in Group Health and its administrators are making every effort to overcome many logistic difficulties and other problems encountered in providing the type of service which their members expect to receive.

PREVENTIVE MEDICINE PROGRAMS

The following statement was included in the 2/26/68 minutes of the Administrative Review Committee. "At the present, a minimum of preventive medicine is practiced at the NIH--even X-rays are not available to employees on an established 'as desired' basis." We contend that this statement is wholly inaccurate, but quite realistically, it does indicate the continued low level of understanding, particularly among some key individuals at NIH, of the nature and extent of the occupational health program at NIH. We will continue to make even greater efforts to elevate this level of understanding. We hope that an early, even though modest, beginning can be made on a multiphasic screening type examination program which would readily be interpreted as preventive medicine.

We are indeed extremely interested in preventive medicine and believe that any occupational health program, worthy of its title, must direct its first attention to prevention; primarily, the control of occupational disease hazards, and secondarily, the prevention and control of non-occupational diseases and

conditions, which if undetected and uncorrected, could affect the productivity and overall welfare of staff members.

Over the years, our principal communicable disease prevention and control program has centered on tuberculosis. We have always urged all employees to receive annual periodic chest X-rays and have scheduled special groups, such as Primate Handlers, personnel from Clinical Pathology, Pathological Anatomy, selected NIAID and DBS laboratories, such as Laboratory of Mycotic Disease and Laboratory of Clinical Investigations, at more frequent intervals. More recently we have updated our tuberculosis control program and are now doing multiple skin tests. We are strongly urging employees with old healed granulomotous chest disease, verified as tuberculosis by skin test, to take isoniazid prophylactically for one year. Studies indicate that their risk of reactivation will be significantly reduced. It is expected that nearly 800 employees will fall into this category. A paper on this subject has recently been prepared for publication in the Journal of Occupational Medicine.

Included in our infectious disease surveillance, control, and prevention activities would, of course, be our extensive immunization programs. In addition to providing immunizations for international travel, we have active programs to insure that all employees exposed to infectious disease agents, for which there are available vaccines, are offered these vaccines and boosters at regular intervals. All employees are offered tetanus toxoid and smallpox immunization at the time of pre-employment and periodically thereafter. Every 3 years an extensive campaign is conducted to raise the level of smallpox immunity as high as possible, not only among patient care personnel, but throughout the entire NIH. This program is currently being studied by the CC Infections Committee following concern expressed by Clinical Directors that patients on immunosuppressive therapy may be inadvertently and unnecessarily exposed to risks of generalized vaccinia. The more exotic vaccines are given to small groups of employees and include vaccines for the arthropod-borne viruses, duck embryo rabies vaccine for high risk animal caretakers, etc. Gamma globulin is administered judicially when necessary for exposures to hepatitis, and routinely to newly assigned chimpanzee handlers in the Primate Quarantine Unit.

Influenza immunizations given during the fall season in cooperation with DBS in the conduct of an influenza virus vaccine study totaled 3,793. Information was sought to assist in determining the effectiveness of influenza virus vaccine, along with additional information on the incidence of reactions to influenza vaccine. Data is being evaluated at this time, but in the absence of a significant influenza epidemic it is unlikely that significant information will be obtained. We hope to obtain sufficient information on reactions to update a previous study on influenza virus vaccine reactions published 10 years ago.

Plans for the NCI Viral Containment Building have advanced at a steady pace during the past year. With the assistance of NCI scientists and contract consultants, we have proposed a comprehensive medical monitoring and surveillance program which will include periodic physical examinations, periodic laboratory studies, including serological studies on fresh and frozen sera, and regular reporting and follow-up of all illnesses occurring among staff members, with particular emphasis on viral respiratory and gastrointestinal illnesses.

During the past year, we have improved our hearing conservation program, directed primarily to employees who are exposed to high level noises in their work environment, particularly the Power and Air-conditioning Plant, and the Carpenter Shop. Audiometric examinations are performed under controlled conditions in a newly installed sound proof booth, and early changes in hearing acuity are uncovered in time to prevent serious and permanent damage.

In cooperation with the NIH Radiation Committee we are now offering potassium iodide, as a thyroid blocking agent, to those individuals working with radioiodine. In this way, the harmful effects of radioactive iodine on thyroid metabolism can be prevented.

As difficult as we know it to be, we accept health education as a challenge and one of our primary responsibilities. The bi-montly lunch time movies, and more recently, the panel discussion on "Job Satisfaction and Mental Health" are evidence of our continued efforts in this difficult area of preventive medicine.

Emotional problems constitute our most difficult health problem. Assisted by three psychiatric consultants who spend a total of 3 days per week in the Employee Health Service, we have offered employee counseling to assist troubled employees in preventing the development of more serious problems. Several "Seminars for Supervisors" have been held in cooperation with PMB. We have had many reports that these seminars have assisted supervisors in recognizing early signs of emotional health problems in their employees and have helped them in referring these employees to appropriate sources of help. Included in this category are employees with chronic drinking problems.

Medical monitoring and surveillance of the Primate Quarantine Staff has recently been reevaluated. Specifically, we now strongly recommend that employees assigned to this area have annual physical examinations which will include extensive laboratory procedures, one of which will be antibody titers on the newer gamma globulin fractions. Many of the Primate Quarantine staff have received numerous injections of gamma globulin and we wish to learn whether or not they are developing antibody titers to human gamma globulin fractions. The determinations are being made by the Immunology Laboratory, NIAID, to whom we are very grateful.

We are directing our attention primarily to the specific hazards of tuberculosis and chimpanzee-associated hepatitis which are the two most serious health problems related to primate quarantine exposures. Enteric pathogens are also serious, but seem to remain under control. Tuberculin-s negative reactors will receive repeat tuberculin tests at 3-month intervals, and all tuberculin-s reactors will receive chest X-rays at 3-month intervals. We plan to use the dual skin testing technique, using both PPD-s and PPD-b the Battey strain. Converters to PPD-s, defined by rigid criteria, will be offered INH chemoprophylaxis for one year.

We are also reevaluating our current practice of offering gamma globulin to Primate Quarantine employees every 3 months. Although this has been our policy for several years, review of our Employee Health records indicates that these employees have not received gamma globulin on any consistent basis. We are

attempting to obtain information from various primate centers, as well as from CDC, and will attempt to develop a rational approach to this problem. In the meantime, however, we have strongly recommended that all new employees assigned to the Primate Quarantine area receive gamma globulin prior to exposure, and every 3 months thereafter for a period of one year. Recommendations for the older employees who may have already developed sub-clinical hepatitis, and hopefully, immunity, will be delayed pending receipt of further information. We have also urged the Primate Quarantine Section to run batteries of liver function tests on newly arrived chimpanzees at the end of the quarantine period and, if possible, whenever clinical illness is apparent in a chimpanzee.

We regret that even the partial outline of our more active programs in preventive medicine is so little known to the NIH executive staff. Without any hesitancy, we consider our activities in preventive medicine our most important function and one which, coincidentally, is much more comprehensive than other Employee Health programs in the government, as well as in a large segment of private industry. We welcome assistance in bringing these facts to the attention of NIH management.

ADMINISTRATION CONSIDERATIONS

Plans are being completed for the opening of three new Employee Health Units during the next fiscal year, one serving Buildings 37 and 38, another located in the Barlow Building, and the third in the NCI Viral Containment Building. Employee Health services, comparable to those now being offered in existing Health Units in Buildings 31, 13, and Westwood Building, will be offered in these new units.

The NCI Viral Containment Unit will be staffed by a half-time nurse. Because of budgetary restrictions, it was not possible to obtain a "position" for this nurse. However, due to the importance of this nurse in carrying out our responsibilities in occupational disease monitoring and surveillance of employees assigned to this facility, NCI will provide the nurse, but will detail her to the Employee Health Service. Much of her work will involve traditional public health nursing functions, with contact with private physicians and other community resources, extensive record keeping, surveillance of illness occurring among staff members, and assistance in acquisition of frozen sera samples. Because of long-term follow up needed in a program of this type, extensive electronic data processing techniques are being developed to assist in record keeping. We are hopeful that we can apply some of the lessons learned in the NCI Viral Containment program to some of our other areas of occupational disease surveillance.

During the past year, our Chief Nurse, Mrs. Frances Daly, retired and has been replaced by Mrs. Barbara Walz. In addition, we have established the position of Assistant Chief Nurse and Mrs. Margaret Moffett has assumed this responsibility. Dr. Elihu M. Okin joined our staff as Associate Medical Officer during FY 1968. Dr. Anthony DeMeo will complete his 2-year tour of duty in July 1968.

Once again, we comment for the record that we face a critical space problem. Efforts have been repeated, unsuccessfully thus far, to obtain space at the opposite end of the B2-A corridor, adjacent to the morgue and presently occupied

by NIMH. We understand that this committment to NIMH is so firm at this time that it is unlikely that we will be able to obtain the space in the near future. However, we hope that our needs will be kept in mind in the event that conditions change and the space becomes negotiatable.

PUBLICATIONS

DeMeo, A.N.; Lynch, J.M.: Updating Tuberculosis Control in Occupational Medicine, J. Occup. Med. 1968. In press.

Table I. Selected Statistics

General	FY1968	1967	1966	1965
Total visits	25,787	26,980	26,050	25,405
Visits for occupational injuries and diseases	2,506	2,418	2,230	2,190
Immunizations	9,344	9,620	9,300	5,284
Pre-employment physical examinations	2,688	1,862	2,680	2,432
Laboratory examinations	18,329	15,200	14,500	12,005
Referrals to personal physicians	1,591	1,395	1,500	1,381

Staff				
Physicians	3	2½	2½	2½
Nurses	11½	11½	11½	11½
Clerical	4	4	4	4
Laboratory	2	2	2	2

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

ENVIRONMENTAL SANITATION CONTROL DEPARTMENT

CC-81
Serial No.

Program Goals ES-1

Progress Achieved ES-1
Administration ES-1
Environmental Studies ES-2
Production Improvements ES-4
Quality Control ES-5
Training Provided Department Staff ES-6
Training Provided Non-Departmental Personnel ES-7
Miscellaneous ES-7

Problems ES-8
Hazards and Production Slow-Down ES-8
Personnel Problems ES-8
Space ES-9

Plans for Fiscal Year 1969 . . . . ES-9
Administration ES-9
Technical Services and Environmental Studies ES-9
Production Improvement ES-10
Training ES-10
Systems Analysis Program ES-10
Publications ES-10
Presentations ES-11

Charts

1. Positions Filled by the Month ES-12
2. Reasons for Personnel Leaving ES-13
3. Number of Separations ES-14
4. Value of Supplies Issued by the Month ES-15
5. Expenditures by Fiscal Year (Supplies) ES-16

Table No. 1 - Formal Training--Classroom ES-17

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

ENVIRONMENTAL SANITATION CONTROL DEPARTMENT

CC-81
Serial No.

PROGRAM GOALS

The goals of the department are to provide a bacteriologically and physically safe, comfortable, and esthetically pleasant environment within the Clinical Center for patients, staff, and visitors; and to promote the use of knowledge gained in the Clinical Center by other institutions. To reach these goals, the department must:

1. Strive to improve cleaning performance in all areas.
2. Continue to train all supervisors and laborers to perform at a high level and most economically.
3. Complete and further implement the department's Systems Analysis Program.
4. Publish results of DESC studies in appropriate journals.
5. Promote the department's capabilities in environmental control activities.

PROGRESS ACHIEVED

Administration

Throughout the year an average of 236 wage-board employees, in three units were actively engaged in cleaning the Clinical Center's more than 1,250,000 (gross) square feet of patient, laboratory, and miscellaneous space.

Laborer personnel are usually procured through Civil Service certificates of eligibles or walk-in candidates for employment. The summer of 1967 marked an interesting departure from this procedure. The Chief, Operations Section, with Clinical Center personnel representatives, participated in the Washington Concentrated Employment Program Job Fairs, by traveling to various locations in the Metropolitan Washington area, to reach and offer employment to qualified disadvantaged persons. Five visits were made to interview 58 applicants. Thirty-one were accepted for temporary 700-hour appointments. Nine of these appointees were eventually converted to career-conditional status and remained on duty in the department. Altogether, 80 employees entered on duty during the year. (See chart 1, p. ES-12)

The most significant factor influencing employee decisions to leave the department (Chart 2, p. ES-13) is the necessity for week-end and holiday duty. Twenty-three (38%) of the 60 employees who left the department during FY 1968, transferred to different positions within the Clinical Center and other components of NIH, or in other Federal agencies that offered Monday through Friday daytime work. (Charts 2 and 3, pp. ES-13 and ES-14.)

Six employees earned Sustained Superior Performance Awards for their enthusiasm, outstanding performance, and pride in maintaining cleanliness in the Clinical Center. Nineteen employees earned letters of commendation for maintaining outstanding attendance records throughout the year. Twenty-two employees earned promotion to higher grades.

Environmental Studies

A continuing program of evaluating cleaning equipment for department use revealed many design problems in newly-marketed products. Specific examples include: carpet pile-lifters that create aerosols and contaminate room air, generate very high levels of noise, and remove excessive amounts of carpet pile; wet pick-ups that are heavy, bulky, and leak liquids onto the floor; and carpet shampoo machines that do not thoroughly clean pile surfaces. The careful testing and selection of mechanized equipment minimized the purchase of poorly designed equipment, which in turn, reduced costs and lost man hours.

NIH Procurement Section accepted an improved GI can dolly design developed by the D&T Section, which has a low noise level when a GI can is being transported on it along a corridor. Decibel readings obtained on this new design range from 2 to 3 decibels above background levels, compared to 17 to 19 decibels for the old design. The conversion of all old dollies to the new design is currently underway. The specification for purchase of new dollies will not only include noise-dampening devices, but casters that are quiet and easily maintained.

A study of chlorinated scouring powders was completed. This study resulted in the discontinued use of GSA "chlorinated" scouring powder in the Clinical Center. The chlorine is not completely released to kill microorganisms in the short period of time the powder is left on the surface to be cleaned. The Veterans' Administration and the Offices of the Surgeon Generals of the Army and Navy, have either converted to our approved product or have put strong pressure on GSA to change its specifications. We understand that GSA is revising its specifications.

The possibilities of spontaneous combustion in stored oil-treated dust mops was investigated. A 1 to 3° F. temperature rise in the storage containers indicates that our oil treated materials and storage practices are satisfactory.

Capabilities and qualifications of 25 industrial companies interested in laminar flow research were reviewed with the National Cancer Institute. The D&T Section made recommendations to the "Life Island" medical coordinator about the five most capable companies. Three of these were selected by the NCI Review Committee to draft preliminary laminar flow room designs.

Floor cleaning procedures on 12-West Nursing Unit were evaluated by use of bacterial sampling. It was found that vacuuming prior to mopping could be eliminated. Vacuuming with portable units is slow, noisy, and disruptive. Bacterial build-up on floors four hours after wet mopping is approximately 34% of the total count prior to mopping. The use of a disposable dust mop four hours after wet mopping was found to reduce the Staph aureus level to that found immediately after mopping with germicidal detergent.

In addition to the daily Life Island monitoring, one related project was studied. The D&T Section collaborated with the National Cancer Institute in evaluating the need for sterile air for patients receiving cancer chemotherepy. After removal of absolute air filters from the Island console, a combination of air samples and surface samples was collected to determine if room levels of contamination would be produced within the Life Island enclosure. Because of a reduction of bacteria passing through the Island air system, the microbial quality of air could not be duplicated. All surface samples within the Life Island were negative, implying that particulate fallout did not occur within the enclosure. Thus, it was not possible to provide room air quality to the Life Island interior by removal of its air filter system.

The elimination of Pseudomonas aeruginosa from patient wash basins and bath tub drains continued to be a difficult problem. When tap water ran into the fixtures, Pseudomonas aeruginosa from the drain was aerosolized into the room air. A technique was developed which permitted pathogen-germicide contact time of 5 minutes on all interior sink surfaces, and the drain line above the trap, but the use of a 600 ppm chlorine solution in 135° hot water failed to eliminate Pseudomonas. Therefore, a new approach is planned which will be directed toward reducing the "slime" growth within the sink drain. This will be accomplished by use of selected chemicals followed by a germicide hot water solution for a 5-minute contact period. It appears that the slime growth protects organisms from the germicide action. Limited effort is currently being expended on this project until the Environmental Services Branch Laboratory can show that Pseudomonas aeruginosa in the drains are of the type found in patients.

A cooperative carpet study between the National Bureau of Standards and the Clinical Center was approved. Routine meetings are being held between the NBS and DESC. The department's responsibilities include: microbiology, static electricity, soil uptake rates, cost of maintenance, and cleaning problems associated with carpeting in a hospital environment. The study will use a "before" and "after" approach on the same nursing unit. This is necessary due to problems of obtaining similar type patients. Tentative date for carpet installation is December 1968.

A project to evaluate floor finishes is in process to find a material that does not require buffing, retain a matte gloss, and is resistent to scuffing, black marks, chemicals, detergents, and wear. Floor finish laboratory test procedures are being collected by the D&T Section from Government and private sources for our possible use. About 25 procedures are being compiled into a laboratory manual. In addition, a bacteriological test procedure for floor finishes is being developed to determine bacteriostatic effects of finishes, and also provide a simple control check for incoming stock. In-use testing of metal-complexed polymer floor finishes is being conducted by the Operations Section.

A serious laboratory cross-connection was discovered in the patient area. A water faucet aspirator in a kitchen converted to a laboratory, was being used to pull fresh water through a series of used hemocytometers in order to remove the residue of blood. Neither the faucet nor the water supply line had vacuum breakers. Steps were immediately taken to correct this problem.

Recently purchased and installed patient-area ice machines were sampled for bacteria on the discharge chutes. A cleaning procedure was designed and incorporated in the cleaning routine.

For several years, musty odors had been noticed in one public rest room. A detailed investigation showed a partial blockage of the louvered air inlet to the rest room. The water closets were not properly sealed to the floor, allowing sewer gas to enter the room. Cleaning of the air inlet, plus sealing all fixtures to the floor with silicone rubber, eliminated the odor problem.

Production Improvements

Concentrated germicidal detergent has the same amber color as our liquid handwashing soap; consequently, it could be placed accidentally in hand-soap dispensers. To prevent this, a water soluble, odor-free, inert green dye was added to the liquid hand soap. Numerous favorable comments were received about the "new soap." "It smells good," and "It lathers better," were commonly heard statements. This again points up how the public may draw conclusions that are not based on facts.

Two environmental control methods (walk-off mats and disposable dust mops) have been tried on 12-West Nursing Unit to help prevent the movement, via shoe soles, of Staph aureus organisms from rooms of patients with dermatological problems. The first method failed due to a combination of improper mat design and ineffective bacteriostatic compound. The second method was more successful.

It involved the use of treated disposable dust mops four hours after wet mopping with a germicidal detergent. The appearance and bacteriologic sampling of the floors, demonstrated the effectiveness of this cleaning adjunct in the 12-West Nursing Unit dermatology area. This cleaning procedure was incorporated into our routine cleaning program on 12-West.

The department's Systems Analysis Study (SAS) of Housekeeping Operations made good progress. This study seeks to save manpower by designing cleaning procedures to the real needs of providing a sanitary environment, improving individual productivity through work simplification, methods improvement, better equipment utilization, plus training of supervisors and laborers. (See Table 1, p. ES-17, for extent of training.)

The SAS team completed studies, developed schedules, trained employees, and implemented system concepts in 37 areas, which is 65% of the Clinical Center studied. Five more areas were partially implemented.

Manpower savings realized by this study were used to establish project cleaning teams. The teams were trained for specialized cleaning tasks such as wall washing, ceiling washing, light fixtures washing, floor stripping and refinishing, and were utilized to clean sections of the Clinical Center not previously cleaned on a regular schedule. In addition, the section is prepared to accept cleaning responsibility for approximately 78,000 gross square feet of new construction areas in the new library and "D" wings without an increase in personnel ceiling.

A window key was designed and placed in use. The new key is more durable and effective for use on Clinical Center windows.

Thirty vacuum cleaners were converted from enamel to brushed-chrome power heads and muffler covers. Following the conversion, an average improvement of 16.6 inches of vacuum in the performance of the vacuum cleaners was noted.

Forty-six standard mopping units were equipped with carry-all handles that allow the employee to keep all necessary supplies with him as he works, and eliminate much travel to and from gear rooms for supplies.

The section acquired two upright vacuum cleaners and a carpet shampoo machine for maintenance of greatly increased carpeted areas.

Quality Control

Continuing efforts were made toward the development of an inspection system which will provide a numerical index for the overall level of cleanliness, orderliness, and maintenance in the Clinical Center. Interest was shown in the project by the Computation and Data Processing Branch, Division of Computer

Research and Technology, Building 12. Preliminary discussions indicate that ADP machines are not necessary for our purposes, but a method of using manual techniques was suggested for trial purposes.

A cleaning frequency study to determine levels of microbial contamination on selected surfaces within patient rooms throughout the Clinical Center was completed. Thirty-six rooms were selected on a random basis and 15 sampling sites designated in each room. Microbial levels and existing cleaning frequencies were evaluated. Consequently, new frequencies were established based on esthetic and bacteriological requirements. Lengthened intervals between surface cleaning has not resulted in lowered appearance or increased bacterial levels in the environment.

Training Provided Department Staff (See Table No. 1, p. ES-17)

The department pursued a vigorous training program. Chief, Operations Section, attended a three-day management and supervision seminar in housekeeping and sanitation, presented by Service Engineering Associates, in November 1967. The labor foreman, Night Service Unit, attended the 19th Annual Course in Hospital Housekeeping at Michigan State University during April and May 1968. Chief, Operations Section, and the three unit chiefs completed the Michigan State University course in hospital housekeeping.

Chief, D&T, attended a 30-hour NIH course on Research Report Writing, and two secretaries attended three secretarial courses for a total of 66 hours.

Within the department, more than 5,800 man-hours were devoted to training programs affecting all employees. Sixty-two percent of this intradepartmental training was directed to improvement of worker skills in performing basic cleaning procedures on the job.

The emphasis on departmental in-house training programs was shifted this year. Supervisory training was directed toward active class participation in problem-solving sessions. The all-employee group training was changed from monthly to bi-monthly meetings. One-hour sessions were considered too long. Therefore, one-half-hour presentations, consisting of a short talk using visual aids, was instigated.

A complete re-evaluation of training aids produced during the past few years was initiated. Two series of work procedures were photographed and are highly satisfactory. A slide retrieval and information system was developed, making it possible to locate desired transparencies with a minimum of effort. A series of mopping procedures is being animated from which a slide-tape presentation will be made.

Training Provided Non-departmental Personnel

A sanitarian intern trainee from the Division of Direct Health Services was with DESC for three weeks. During this time, he was trained in both theoretical and operational aspects of environmental control principles. An Environmental Sanitation Control Training Outline was developed and will be the basis of all intern sanitarian training in the Clinical Center.

An agreement was made with the Hannah Harrison School of the Y.W.C.A. One of their housekeeping trainees from each class will spend three weeks with DESC, studying environmental control principles. One student has completed the course, and Hannah Harrison School officials are highly pleased.

A sanitarian from the Pennsylvania State Health Department spent one week with DESC and was trained in hospital housekeeping techniques, plus environmental control principles.

Chief, D&T Section, participated as a lecturer in a Hospital Microbiology Course held in San Juan, Puerto Rico. The course was sponsored by the Puerto Rico Health Department, Hill-Burton Program, and National Communicable Disease Center.

Requests for copies of the department's Cleaning Procedure Manual were received from 198 individuals and organizations from many states and several foreign countries.

Miscellaneous

The elevator service unit met the challenge of increasing work loads and maintained an effective service responsive to the needs of the Clinical Center. This unit traveled more than 27,000 miles and made more than 4,000,000 stops without an accident or major complaint. During this time they responded to more than 15,000 requests for patient transportation and emergency services.

Modesty screens were developed for use on scaffolds. The screens are used to overcome some objection that female employees have about working on scaffolds.

In answer to a request for information from the Office of the Surgeon General, U.S. Army, about cold-water detergents, D&T Section provided a comprehensive review of laundry literature with special reference to bacteriological reduction during the laundry cycle. Data indicated that these detergents clean well, but do not reduce the bacterial flora to the degree found in hot water washing. This search indicated a significant lack of information on bacterial reduction in the laundry wash cycle when using either type detergent.

Progress slowed markedly toward elimination of soapsuds back-up from plumbing drains on 5-West and 2-West Nursing Units. An attempt by Plant Engineering Branch to locate the source of the problem was not successful.

The D&T Section continues to expand its knowledge of laminar flow technology through literature review and visits to Goddard Space Flight Center. Areas of concern include: microbiological monitoring, clean room training methods, cleaning equipment, personnel requirements, and construction features of the rooms.

The section received 16 letters of compliment during the year.

There was a substancial increase in the cost of cleaning supplies this fiscal year compared to FY 1967. (Charts 4 and 5, pp. ES-15 and ES-16.)

PROBLEMS

Many problems that have faced the department in the past remain unsolved. These require action by a higher echelon.

Hazards and Production Slow-down

1. Constantly increasing amounts of Institutes' equipment congest the corridors and freight elevator lobbies. These areas go uncleaned, creating an insanitary condition, as well as a major hazard to life safety. The areas are so congested that rolling fire and cleaning equipment cannot always be gotten through. If a corridor were filled with smoke, it is doubtful whether many employees could find a path through the congested areas to a fire exit. Fire doors are inoperable in many freight elevator lobbies.
2. Cleaning time could be more effectively programmed if planned construction and renovation were known by the DESC. If proposed dates for starting construction projects were known, no major cleaning would be scheduled in the affected areas. Additionally, timely measures could be instituted to help prevent tracking of dirt into other parts of the Clinical Center.

Personnel Problems

1. Transfer and detail of personnel continues to be a major obstacle to D&T Section's program activity. The sanitarian, new to institutional sanitation, returned from temporary duty assignment on March 1, 1967, and transferred to the Division of Allied Health Manpower on February 14, 1968. This was insufficient time to train and utilize the officer to the desired level. An active recruitment program is being carried out to fill the vacancy.
2. One additional full-time technical assistant is required in the Development and Training Section, to help develop and incorporate new improved equipment

and materials into the Clinical Center cleaning program. In addition, he would assist in the CC-NBS carpet study by collecting daily air and surface samples, performing routine tests, and assisting in complicated test procedures under professional supervision.

Space

1. The Development and Training Section has a critical need for space in which to process samples prior to sending to the laboratory to evaluate cleaning equipment and materials, develop environmental sampling techniques, and demonstrate developed ideas. Presently, corridors and gear rooms are used for testing and demonstrations. This creates safety hazards and noise problems, plus inconvenience to Clinical Center staff and visitors. Testing procedures in public areas also attract people, creating additional work delays and hazards. One module (250 ft.^{2}) located in the 1A-wing on the first floor would be adequate to carry out current responsibilities.
2. The Operations Section office space is inadequate. NIH space standards are 125 square feet per person. Space now available allows only 70 square feet per person. In addition, over 250 employees use the office to sign in and sign out each day.
3. The Operations Section needs space near the main supply room for maintenance of machines and for minor repairs, such as battery charging and lubrication.
4. Space is needed to consolidate the Operations Section supplies which are presently stored in many different locations.
5. Employee locker rooms should be air-conditioned

PLANS FOR FISCAL YEAR 1969

Administration

1. Staffing--Provide the department's sections with adequate professional and technical personnel.
2. Space--Provide more adequate space for the Operations Section office, a suitable classroom for training, a minimum of 250 square feet for equipment and materials testing, space to consolidate the storage of the Operations Section's supplies (which are issued daily), and a maintenance and battery-charging area for power equipment.

Technical Services and Environmental Studies

1. Evaluate and compare relative merits of carpets versus resilient tile in patient rooms and ancillary areas. Study maintenance cost, equipment effectiveness, and develop cleaning procedures for the several floor-covering surfaces.

2. Conduct tests on equipment and materials currently used in the program, and investigate new products that are of potential value to environmental programs.
3. Publish important study results of DESC in appropriate journals and books.
4. Establish, on a limited basis, a sanitary index level for the various sectors of the Clinical Center

Production Improvement

1. Adopt new methods, and procure new products and equipment that will improve cleaning efficiency, sanitation, and appearance of the Clinical Center.
2. Pursue literature for cleaning systems and methods used successfully at other institutions, and consider their use in the Clinical Center.
3. Revise the department's Cleaning Procedure Manual to reflect changing concepts and methods of cleaning.

Training

1. Review and revise the orientation and training program for new employees.
2. Develop new training techniques and materials for department-wide use and evaluate their effectiveness.
3. Provide limited training in environmental control methods for sanitarians and housekeepers from other agencies.
4. Develop a resource file and instructor's guide for use in training sanitarians and housekeepers.

Systems Analysis Program

The analysis of all areas of the Clinical Center should be completed. A review of the entire program will be made, and those areas needing additional study will be analyzed.

Publications

Levitan, A. A., Seidler, F. M., Strong, C. D., and Herman, L. G.: The role of supportive services in the operation of an isolator system. JAMA 203: 105-110, Mar. 1968.

Schulte, F. L., and Spence, H. W.: Repackaging liquids by a pump system. Hospitals 41: 86-89, Dec. 1967.

"Slipperiness Tester Being Tested at CC," a report on skid testing of various types of floor finishing products, appeared in the NIH Record 20: 4, Jan. 1968.

Presentations

An abstract, "Environmental Monitoring of Patient Isolator Systems," was presented by Corwin D. Strong, Development and Training Section, at the Association of Sanitarians Annual Convention held in Washington, D. C., June 1968.

Another paper was co-authored and presented by a Development and Training staff member at the combined Clinical-Society-Commissioned Officers' Association Annual Meeting in Atlanta, Georgia.

CHART 1

POSITIONS FILLED BY THE MONTH

OPERATIONS SECTION

April 1, 1967 through March 31, 1968

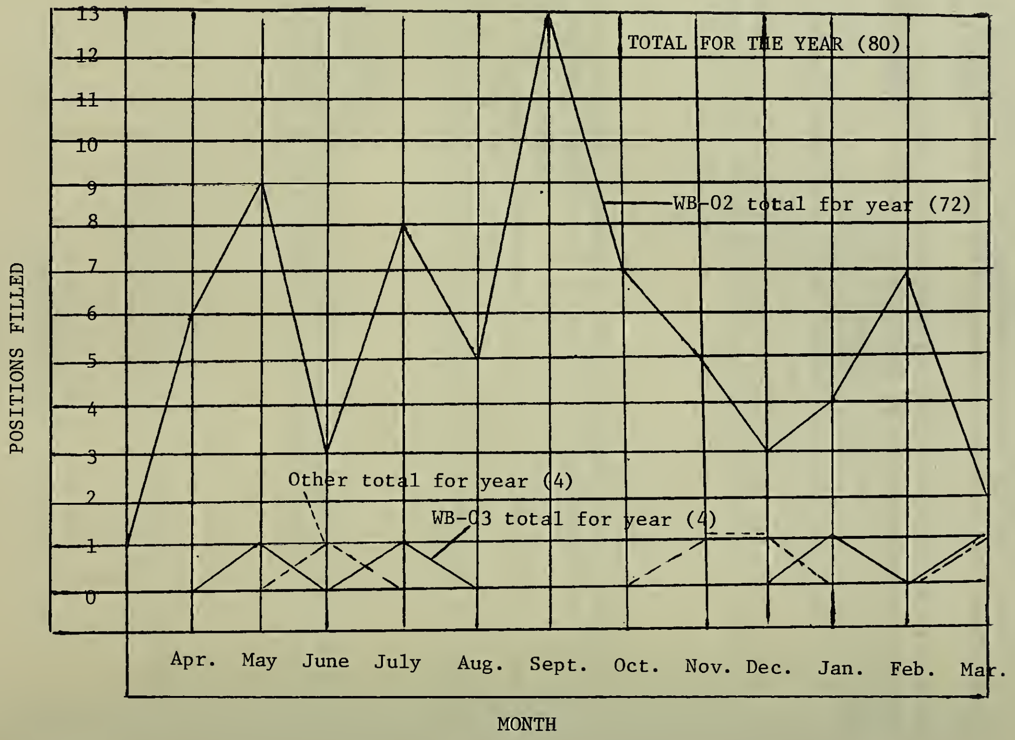
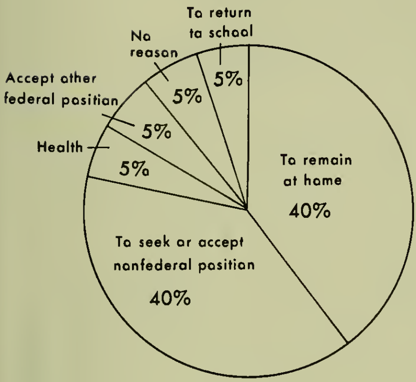


CHART II

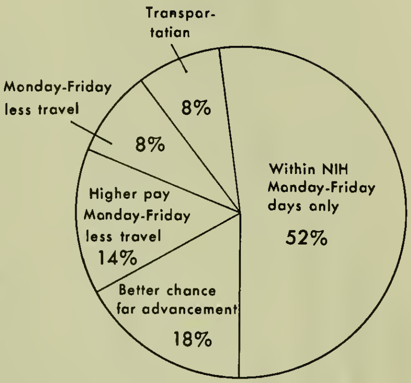
REASONS FOR PERSONNEL LEAVING OPERATIONS SECTION

April 1, 1967 through March 31, 1968

RESIGNATIONS - 24



TRANSFERS - 23



OTHER SEPARATIONS - 13

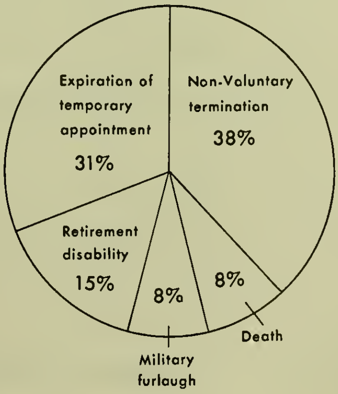


CHART 3

NUMBER OF SEPARATIONS

OPERATIONS SECTION

April 1, 1967 through March 31, 1968

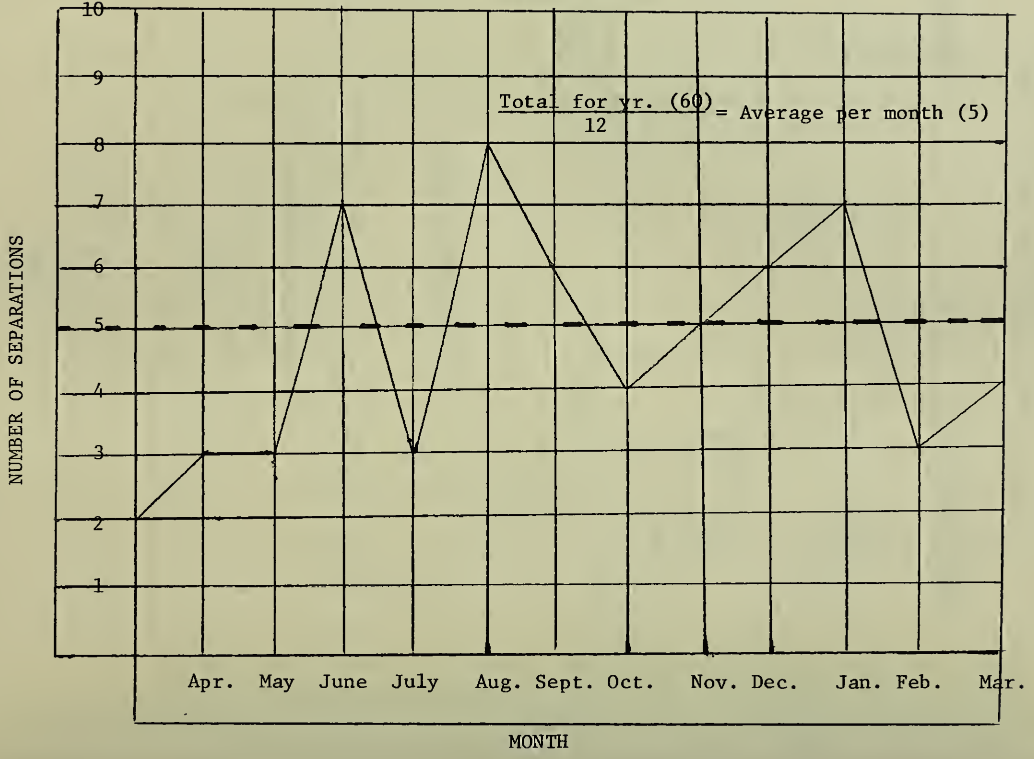


CHART 4

VALUE OF SUPPLIES ISSUED BY MONTH

Operations Section

April 1, 1966 through March 31, 1968

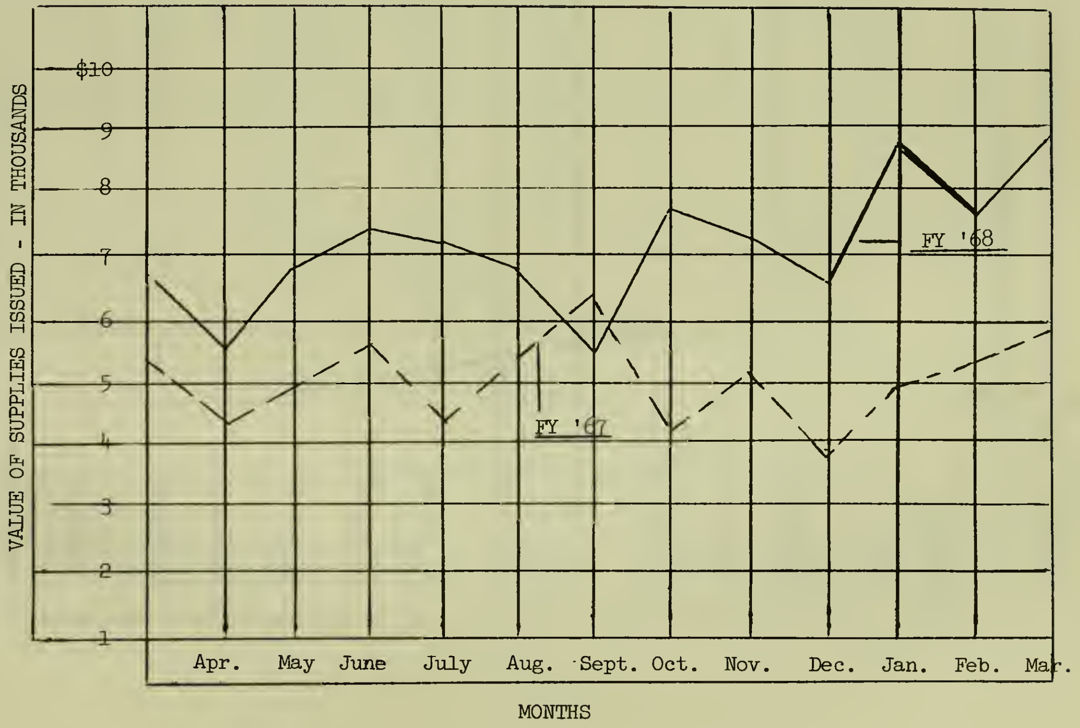
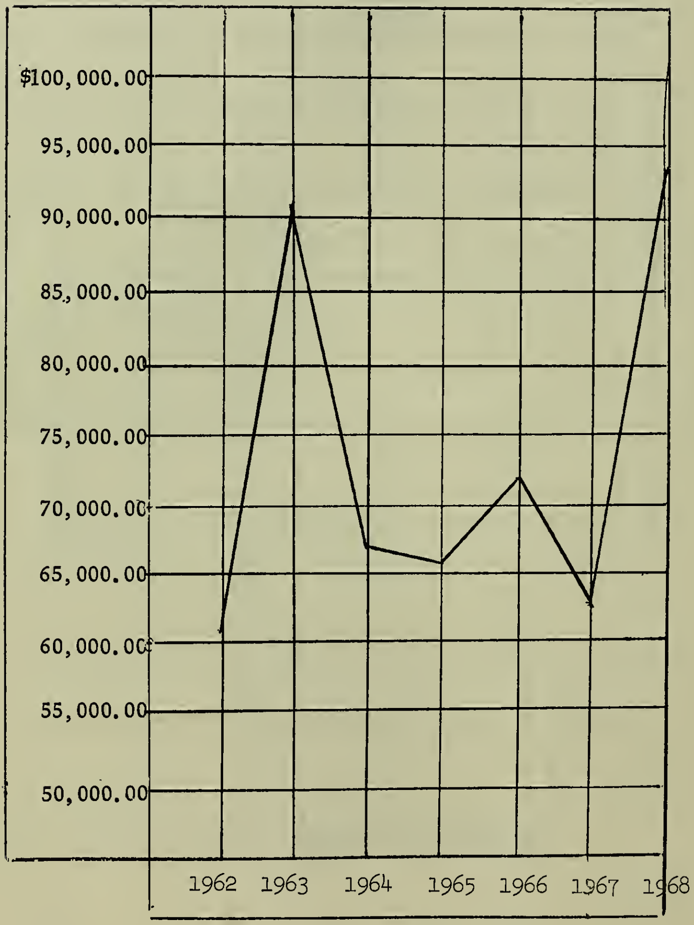


CHART 5

EXPENDITURES BY FISCAL YEAR(SUPPLIES)

OPERATIONS SECTION

July 1, 1962 through March 31, 1968



FISCAL YEARS

TABLE 1

DEPARTMENT OF ENVIRONMENTAL SANITATION CONTROL

FORMAL TRAINING - CLASSROOM

Government		Man-Hours
Research Report Writing (D&T)		30
Effective Writing of Business Letters (D&T)		24
Office Procedures for Secretaries (O/C)		18
Business English (O/C)		24
	TOTAL	96
Non-Government		
Three-Day Management & Supervision Seminars in Housekeeping & Sanitation (OS)		20
Nineteenth Annual Course in Hospital Housekeeping (OS)		416
Board Meeting of the Institute of Sanitation Management (OS)		16
	TOTAL	452
Within the Department		
Certification of Employees (OS)		43
Orientation (OS)		92
Supervisory Training (OS)		469
All Employees Training (OS)		1613
Procedures (OS)		3632
	TOTAL	5849
	GRAND TOTAL	6397 Man-Hours

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

MEDICAL RECORD DEPARTMENT

CC-46
Serial No.

TABLE OF CONTENTS

Objectives....MR-1

Major Progress....MR-1

  Education and Training....MR-1

  Personnel....MR-1

Departmental Activities....MR-1

Major Problems....MR-2

  Coding and Indexing....MR-2

  Locating Medical Records....MR-2

Proposed Future Objectives....MR-2

Table 1: Patient Statistics, FY 1968....MR-4

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

MEDICAL RECORD DEPARTMENT

CC-46
Serial No.

OBJECTIVES

The Medical Record Department assures the completeness, accuracy, safekeeping, and availability of medical records and maintains the following internal controls: (1) Continuing appraisal of the medical records of patients registered at the Clinical Center, to maintain the standards established by the Clinical Center and accrediting agencies; (2) maintenance of required indexes; namely, the analysis of discharged patients and the diseases and operations index, to provide basic data to physicians participating in medical research; (3) maintenance, compilation, and distribution of statistical data concerning patient care for use by administrative, clinical, and research directors; (4) maintenance of a systematic arrangement of medical records to insure their accessibility for patient care service and medical research; (5) maintenance of a system whereby the quantity and quality of dictated medical record reports are controlled; (6) maintenance of an adequate control system for release of medical reports, medical information, and medical records to authorized recipients only; (7) maintenance of perpetual patients' index (Soundex) and patient registry.

MAJOR PROGRESS

Education and Training

Orientation of new employees from this and other Clinical Center departments and from the Institutes was accomplished. Lecture tours continue to be given to the Public Health Service medical record librarian students and other visitors to the Clinical Center.

Key personnel attended seminars, meetings, and the Annual Convention of Medical Record Librarians on subjects relating to medical record organization, management, office equipment, and medicine.

Personnel

The number of employees on duty from July 1967 through March 1968 averaged 62; of this number, an average of 12 served on a part-time basis.

DEPARTMENTAL ACTIVITIES

The Medical Record Department functions to maintain and improve the standards of service it renders to the Clinical Center in particular and to the National

Institutes of Health in general. Therefore, it is necessary to estimate, appraise and execute systems and procedures, and concurrently to maintain an adequately trained staff to program these efforts. Revised working procedures for all sections enabled the department to render more accurate and faster service during Fiscal Year 1968. Supervisory procedure books were established for two sections.

In March the Medical Record Department was reorganized and is officially recognized as being composed of an Office of the Chief and four sections: Files, Record Processing, Medicolegal, and Transcribing.

Approval was received for an additional tour of duty from 5:00 p.m. to 10:30 p.m. thereby enabling the Files Section to provide continuous weekday service from 8:30 a.m. to 10:30 p.m.

Additional filing space was acquired in the B2L area of Building 10. As a result, the approximately 14,000 retired medical records stored in Building 31 were transferred to the new area and an ongoing program of record retirement was begun. The additional space in Building 10 plus new shelving and a physical reorganization within the Department has relieved considerably the critical space situation for housing approximately 51,000 original medical records.

As part of a trial study, two Magnetic Tape Selectric Typewriters were installed in the Transcribing Section. Medical reports dictated by staff members of the National Institute of Neurological Diseases and Blindness were transcribed on this equipment and there was a noticeable improvement in the quality of the finished report. Negotiations are underway to rent four more of these typewriters.

The maintenance of pediatric statistics was discontinued on March 1, 1968.

MAJOR PROBLEMS

Coding and Indexing

The coding and indexing of medical records is incomplete for the period from May 1962 to the present time, and the reliability of the information coded and indexed from July 1953 through April 1962 is extremely doubtful. Although the problem has been reviewed and studied by the Medical Record Committee, the Clinical Center administration and this Department, the major question is still unanswered; namely, what and how much information shall be coded?

Locating Medical Records

There has been difficulty in locating and securing medical records following clinic visits, inpatient discharges, and review by doctors.

PROPOSED FUTURE OBJECTIVES

Resolution of major problems.

Support investigators who are studying the computer adaptation of maintaining the required hospital statistics.

Transfer the Transcribing Section from Building 31 to Building 10.

Continue to investigate new dictating equipment.

Statistics - Work Production: Period covered - July 1, 1967 through June 30, 1968. April, May and June 1968 are projected statistics based on April, May and June 1967.

	July 1, 1967- March 31, 1968	April, May & June 1967	Total
Discs received	7,622	2,397	10,019
Discs transcribed	7,657	2,316	9,973
Material transcribed (pages)	22,512	7,482	29,994

	1 FY 1967	2 FY 1968	3 Percentage ↑ or ↓
Discs received	9,893	10,019	1.27%↑
Discs transcribed	9,867	9,973	1.11%↑
Material transcribed (pages)	32,146	29,994	6.72%↓
Remaining work	119	84*	21.01%↓

*Discs remaining as of 3-31-68

TABLE 1: PATIENT STATISTICS, FISCAL YEAR 1968*

STATISTICS

Registration

Patients			6,510
Inpatients		4,027	
First registration	1,378		
Readmission	2,649		
Follow-up patients (first registration)		2,455	
Walk-in		9	
Emergency		19	

Patient Care Statistics

Total number of admissions	4,027
Total number of discharges (includes 183 deaths)	4,083
Total number of deaths	183
Percentage of deaths	4
Total number of autopsies	172
Percentage of autopsies	94
Available bed days	188,856
Total inpatient days	130,722
Average daily census	357
Percentage of bed occupancy	69
Discharged patient days	133,490
Average length of stay	33
Total number of patients admitted to the Clinical Center from 6 July 1953 through 30 June 1968	49,821
Percentage of patients admitted to the Clinical Center from Maryland, Virginia and the District of Columbia during the current Fiscal Year 1968	41

*THESE ARE PROJECTED FIGURES WITH THE FINAL QUARTER'S FIGURES BEING ESTIMATED.

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DEPARTMENT OF NUCLEAR MEDICINE

CC-40
Serial No.

TABLE OF CONTENTS

General. NM-1
Personnel. NM-1
Radiation Safety Section NM-2
Isotope Procurement. NM-2
Waste Disposal NM-2
Radioisotope Assays. NM-2
Laboratory Surveys NM-3
Personnel Monitoring NM-3
Machine and Sealed Source Inspections. NM-3
Training Courses NM-4
AEC Inspection and Licensure NM-4
Off-Site Use of Radioisotopes. NM-4
Building 21 Addition NM-4
Diagnostic Radioisotope Section. NM-5
Whole Body Counter Section NM-6
Problem Areas and Future Plans NM-7
Publications NM-9

Tables:

1. Clinical Diagnostic Procedures NM-11
2. Whole Body Counter Statistics. NM-12

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DEPARTMENT OF NUCLEAR MEDICINE

CC-40
Serial No.

GENERAL

The past year was the second, and first full, year of operation of the Department of Nuclear Medicine at NIH. It was a year of consolidation with no major administrative or organizational changes. There was no change in allotted space and, due to budget restrictions, very little change in facilities, equipment, or personnel. The exponential rise in the activities of all three component sections continued, however, with remarkably little evidence of the effect of budget restrictions on the requirements of the Institutes served.

PERSONNEL

There were no changes in the personnel of the Diagnostic Radioisotope or Whole Body Counter Sections of the department during FY 1968. The Radiation Safety Section lost both of its experienced clerk-typists, and acquired only one replacement. Two new senior assistant health service officer physicists and one new physical science aide were obtained, thus increasing the staff of the department from 26 to 29 employees. This badly needed increase was partially offset by the loss of nearly one man-year due to illness and injury involving two members of the staff.

The Radiation Safety Section continued to be grossly understaffed at all levels with need for a Deputy Radiation Safety Officer, an electronics technician, several physical science technicians or aides, a custodian, and another clerk.

RADIATION SAFETY SECTION

Isotope Procurement

	1967	1968	Increase
Millicuries	61,105	75,578	24%
Dollars	$453,077	$552,191	22%
Shipments (incoming)	4,064	4,780	17%
Shipments (outgoing)	116	156	34%
Authorized investigators	480	504	5%

The use of radioisotopes at NIH continued to grow at approximately 20% per year, measured by the amount of activity ordered, number of dollars spent, or number of shipments received. The outgoing shipments were tabulated because these entailed much more work in preparation, packaging, and record keeping than is the case with incoming shipments. The annual inventory in the middle of the fiscal year indicated that, exclusive of sealed sources, nearly 25 curies of activity were at NIH.

Waste Disposal

The bulk of the radioactive waste consisting of 80 drums and boxes containing about 16 curies was disposed of through Edgewood Arsenal. A commercial service was used on one occasion to dispose of uranium and thorium compounds. The sea disposal license was not utilized. Large numbers of counting samples, animal carcases, and other materials with low levels of tritium and carbon-14 were disposed of by incineration.

Radioisotope Assays

	1967	1968	Increase
Radiopharmaceutical assays	3920	4700	20%
Bioassays (radiourinalysis)	174	650	375%

The increase in radiopharmaceutical assays was due to increased numbers of examinations in the Diagnostic Radioisotope Service and to increased use of very short half-lived radiopharmaceuticals requiring daily assay of new supplies. Bioassays were increased by a factor of three due to the need for increased surveillance of relatively large numbers of staff working routinely with high levels of ^{32}P and ^{3}H.

Laboratory Surveys

More than 1,300 laboratory or other area surveys were performed in 18 buildings. This contrasts to the 350 performed last year. The tremendous increase was made possible by training an additional technician and utilizing three people on overtime instead of two.

Personnel Monitoring

Film Badges

	1967	1968	Increase
Film badges developed	12,285	13,891	13%
New badges issued	469	603	28%

The 603 new badges issued represented a great deal of effort on the part of the film badge staff because of the elaborate records that had to be compiled. This data includes Social Security number, sex, date of birth, employee number, job assignment and supervisor for each new individual. This assures positive future identification and permits indexing with type of work activity, amount and kind of radionuclides handled, and other factors pertinent to radiation exposure.

Machine and Sealed Source Inspections

	1967	1968	Increase
Sealed sources	312	383	23%
Curies	9,426	6,604*	
No. of radionuclides	10	8	
Radiation producing machines	115	148	29%
Number of surveys	36	77	213%

*Reduction due to natural radioactive decay of ^{60}Co sources.

It was possible to double the number of surveys on radiation-producing machines during FY 1968 through greater utilization of one senior health physicist and one new commissioned officer. It is still apparent that these pieces of equipment are being surveyed on the average of only once every two years.

Training Courses

Two 10-day radioisotope training courses were held at NIH during the year. Participation increased to 64 students in the spring course, compared to the usual 54 students per course in the past. Because of continued demand for training, one course was arranged with and conducted by the staff of the National Center for Radiological Health at their facility in Rockville. This course accommodated only 25 students and required participation by 6 members of our staff to provide 11 hours of lectures. Despite the demand for training in radioisotopes on the part of NIH scientists, it was difficult to fill the Rockville course. It is doubtful that this was a completely satisfactory solution to the problem of providing increased training facilities for NIH scientists. A total of 140 participants received training in the three courses offered during FY 1968.

AEC Inspection and Licensure

The NIH broad byproduct materials license was inspected over the course of 5 days last November. For the first time in many years we were not cited for any item of noncompliance. An application was filed in January 1968 for renewal of this broad license which was customarily granted for a 2-year period. This time NIH was granted a 5-year license extending to April 30, 1973. For the first time we have now been requested to submit an annual report of nonroutine uses of radioisotopes in man at NIH.

Off-Site Use of Radioisotopes

Pursuant to Policy and Procedure Memoranda, Intramural Program No. 14, dated October 31, 1967, a centralized records system was established by AEC on all off-site licenses issued to NIH staff members. The off-site work continued to expand during FY 1968 and created a significant work load for the Radiation Safety Section in record keeping, license review, technical counseling, and actual ordering and delivery of radioisotopes. Among the new or expanded operations of NIH scientists off-site were those at Research Triangle Park, North Carolina; the Baltimore Cancer Research Center; the Cancer Chemotherapy project at the Veterans Administration Hospital, Washington; and continuing investigations at the marine biological laboratories at Bar Harbor, Maine, and Bimini, W.I.

Building 21 Addition

Fiscal year 1968 marked the complete evolution of an architectural plan and specifications for an addition to the Radioisotope Laboratory, Building 21. The funds budgeted for this construction were released by the Bureau of the Budget, and the Plant Engineering Branch was given authority to supervise the construction of this building. A release from budget restrictions imposed by DHEW was granted in May 1968.

DIAGNOSTIC RADIOISOTOPE SECTION

The Diagnostic Radioisotope Section, which was created and progressively expanded in the latter half of FY 1967, consolidated its position during the past year. There were no changes in personnel or space, but facilities were improved with the installation of an automatic x-ray film processing unit and redecoration of the Diagnostic Radioisotope Clinic area. A Positron III attachment for the gamma scintillation camera purchased by NINDB was installed in May.

FY 68 was a year of completing a record number of routine diagnostic examinations and developing a number of technical advances for the performance of new or improved procedures. Over a dozen scientific manuscripts were produced by the staff of this section, alone or in collaboration with investigators from other departments and Institutes.

A good deal of developmental work was done in collaboration with the Radiopharmaceutical Service of the Pharmacy Department. Evaluation of technetium sulfur colloid as an agent for liver and bone marrow scanning was continued. During the year this material became commercially available; this relieved NIH facilities and enabled personnel to work on such other products as technetium labeled albumin and technetium labeled microaggregated albumin. It was determined that these materials with the ^{99m}Tc label could largely replace the analogous ^{131}I-labeled agents with consequent reduction in radiation dose to patients and improved scans. The only radionuclide new to our Service this year was iron-59. With special profile scanning techniques, ^{59}Fe was used to assess bone marrow distribution and function.

A major effort was made during the year to develop techniques for recording dynamic studies of the heart and certain regional major blood vessels. In collaboration with the Television Engineering Unit of the Clinical Center, very effective means were devised for video tape recording of images produced by the gamma scintillation camera. This technique was evaluated in patients of the National Heart Institute and the promising resultant findings were jointly reported at several scientific meetings.

In a collaborative study with the clinicians of the Radiotherapy Branch of the National Cancer Institute, advanced techniques of renography using the gamma scintillation camera were employed in very successful evaluation of the effects of abdominal radiotherapy upon renal function. Another productive area was the investigation of cerebrospinal fluid rhinorrhea in patients of NINDB including a number from local Army and Navy hospitals. The technique of radioisotope cisternography was applied very successfully to the diagnosis of the site of the leak in a large percentage of these patients.

The work load of the Diagnostic Radioisotope Section in the past year was at a maximum capacity. Dr. John C. Harbert, Chief of the Whole Body Counter Section, spent about 80 percent of his time assisting Dr. William L. Ashburn, the only full time physician in the Diagnostic Section. Dr. Jack D. Davidson, Chief of the Department, also spent a very appreciable part of his time directly on this diagnostic work. During the year we had one physician trainee from the Department of Diagnostic Radiology for a period of 3 months. Because of the shortage of professional manpower, it was necessary to refuse to undertake several interesting and worthwhile investigations proposed by clinicians from various Institutes. Our first Clinical Associate physician is scheduled to arrive in July 1968, but this acquisition will be entirely eclipsed by the loss of the chief of the section, Dr. Ashburn, who will be leaving NIH at that time. (See Table 1, p. 9)

In a number of instances during FY 1968, diagnostic or research applications of radioisotopes in patients were performed by physicians of the various clinical services using the equipment and facilities of the Department of Nuclear Medicine following a period of training by our staff. Such projects included studies of lymphedema by clinicians of the National Heart Institute using ^{131}I-human serum albumin; a large series of serial measurements of thyroid radioiodine uptake performed by physicians of NIMH using iodine-132; studies by physicians of NCI aimed at locating abscesses in deep parenchymatous organs using ^{51}Cr-labeled leukocytes; quantitation of relative and absolute localization of chromium-labeled white cells in liver and spleen by investigators of NCI; and standard determinations of blood volume by a number of physicians from various clinical services.

WHOLE BODY COUNTER SECTION

The whole body counter continued to be the most accurate and convenient method of determining total body potassium by counting ^{40}K and such determinations comprised approximately one-quarter of the counts performed. Previously inaugurated studies measuring ^{47}Ca, ^{24}Na, ^{51}Cr, and ^{131}I-protein retention continued in support of the investigations of several of the Institutes.

Use of the whole body counters for assessing internal contamination of radioisotope workers with ^{32}P, ^{125}I, ^{131}I and other radionuclides, in collaboration with the Radiation Safety Section, increased 150%. Such measurements proved more reliable than previous dependence upon urine assays and assumed an increasingly important role in the radiation safety program as the levels of radioactivity used continued to rise. The high activity room was calibrated for ^{82}Br to implement the measurement of bromine space in studies undertaken by NIMH to determine the effect of lithium therapy on electrolyte distribution in certain psychiatric patients.

An in vitro radioisotope diagnostic service was inaugurated using a part of our electronics laboratory and the when-available services of the two whole body counter nurse-technicians. The T-3 test of thyroid function was selected for our first efforts in this area. A comparison study was made of five commercially available T-3 kits. Using the one that best suited our purposes, we are now preparing to do all T-3 tests for the Clinical Center. It is hoped that this will provide more reliable data than that provided in recent years through the mechanism of a contract with a commercial laboratory.

In addition to their other duties, the two nurse-technicians of the Whole Body Counter Section were instructed in the coding of diagnostic scan records using the Termatrex system. The equipment necessary for this was acquired by the Radiotherapy Branch of NCI and made available for use by the Department of Nuclear Medicine. This permitted rather elaborate cross-filing of clinical scan studies. (See Table 2, p.10)

PROBLEM AREAS AND FUTURE PLANS

As in previous years, the major problems of the department stemmed from the ever-increasing work load and the shortage of personnel and adequate space. Once more the full complement of requested positions failed to materialize, and there was no relief from the overcrowded conditions in the Isotope Laboratory. We are now in a situation where additional space must be acquired before added personnel can be used effectively.

The final approved 100% architectural plan for the addition to Building 21 is on hand, the funds for construction are available, and, if the final administrative release can be obtained, a contract for the construction should be a reality within a couple of months. If things go even reasonably well, the addition should be completed within the next 12 months and ready for occupancy. It is to be hoped that as this proceeds it will be possible to be actively recruiting needed personnel so that no time will be lost when the space becomes available.

Despite the budget restrictions of FY 1968, several badly needed pieces of major technical equipment were acquired or ordered for the Radiation Safety Section. Additional items are needed but, as with personnel, space for the equipment must be acquired first. One item exempt from the above restriction is an additional truck. This was requested in the FY 1969 budget and is now urgently needed. The only factor that has averted decompensation of our pickup and delivery service has been the delay which has also occurred with respect to the anticipated opening of new research buildings on the NIH compus. It now seems unlikely that this factor can continue in our favor much longer.

The Diagnostic Radioisotope Section found it necessary to deliberately hold back from several innovations in the area of radiopharmaceuticals, due to limitations of space and personnel in both the Radiation Safety Laboratory and the Radiopharmacy. Thus, it has not been possible to inaugurate the use of either indium-113m or strontium-87m because of the lack of space and personnel for the operation of the generators involved. An additional limiting factor has developed recently with the decision of the Chief of the Diagnostic Radioisotope Section, Dr. William L. Ashburn, to leave NIH. Indications are that it will be very difficult to obtain an equally well-qualified replacement for Dr. Ashburn, because the salaries which prevail in competing institutions for physicians qualified in nuclear medicine are substantially higher than salaries available at NIH. The loss of Dr. Ashburn will make it necessary to curtail certain nonessential services and to retard the further development of the clinical program toward a fully capable clinical nuclear medicine service.

Another major problem of the department arises from its efforts to provide training for NIH scientists in the use of radioisotopes. The two courses per year that have been given for the past several years appear to meet only about half of the demand. Even these are now in jeopardy as being about the last remaining activity of the department that can be eliminated to reduce the work load without any risk to our need to comply with AEC regulations. Our experiment with a course conducted by the National Center for Radiological Health for NIH scientists was not particularly successful either from the standpoint of acceptability by NIH scientists or from the standpoint of significantly relieving our own staff from having to make a major contribution to this training effort.

Mention was made in the FY 1967 annual report of the desirability of having convenient access to a nuclear reactor. The new reactor at the National Bureau of Stnadards has proceeded on schedule, achieved criticality in December 1967, and is expected to be available for use by area scientists early in FY 1969. Preliminary conferences have been held with the NBS reactor staff and things look promising for the use of this powerful facility by NIH scientists.

PUBLICATIONS

Ashburn, W. L., Di Chiro, G., Briner, W. H., and Harbert, J. C.: ^{99m}Tc-albumin for brain scanning. *Drug Intelligence* 1: 314-316, Oct. 1967.

Ashburn, W. L., Harbert, J. C., Briner, W. H., and Di Chiro, G.: Cerebrospinal fluid rhinorrhea studied with the gamma scintillation camera. *J. Nucl. Med.* 1968. In press.

Ashburn, W. L., Harbert, J. C., Whitehouse, W. C., Mason, D. T., and Schuette, W. H.: A video system for recording dynamic radioisotope studies with the Anger scintillation camera. *J. Nucl. Med.* 1968. In press.

Cliggett, P. A., and Brown, J. M., Jr.: Assays of radioactive materials for use in patients -- a five-year study. *J. Nucl. Med.* 9: 236-240, June 1968.

Davidson, J. D., and Oliverio, V. T.: Tritium and carbon-14 by oxygen flask combustion. In Rothchild, S. (Ed.): *Advances in Tracer Methodology* Vol. 4, New York, Plenum Press, 1968, pp. 67-79.

De Vita, V. T., Denham, C., Davidson, J. D., and Oliverio, V. T.: The physiological disposition of the carcinostatic 1,3-bis(2-chloroethyl)-1-nitrosourea (BCNU) in man and animals. *J. Clin. Pharmacol. Ther.* 8: 566-577, July-August 1967.

Di Chiro, G., Ashburn, W. L., and Briner, W. H.: High specific activity ^{99m}Tc-albumin as a tracer for subarachnoidal and ventricular scintiphotography. *Arch. Neurol.* 1968. In press.

Di Chiro, G., Ashburn, W. L., and Grove, A. S.: Which radioisotopes for brain scanning? *Neurology* 18: 225-236, March 1968.

Di Chiro, G., Ommaya, A. K., Ashburn, W. L., and Briner, W. H.: Isotope cisternography in the diagnosis and follow-up of cerebrospinal fluid rhinorrhea. *J. Neurosurg.* 1968. In press.

Harbert, J. C., and Ashburn, W. L.: Radiostrontium bone scanning in Hodgkin's disease. *Cancer* 1968. In press.

Harbert, J. C., Ashburn, W. L., and Davidson, J. D.: An improved method of renography using the split crystal scintillation camera. *J. Urol.* 1968. In press.

Howley, J. R., Robbins, C., and Dickinson, M. B.: Thermoluminescent radiation dosimetry applied to dental x-ray exposures. *Radiol. Health Data Rep.* 1968. In press.

Johnson, R. E., Doppman, J. L., Harbert, J. C., Steckel, R. J., and MacLowry, J. D.: Prevention of radiation nephritis with renal artery infusion of vasoconstrictors: experimental and preliminary clinical studies. *Radiology* 1968. In press.

Kramer, R. S., Ashburn, W. L., Vasko, J. S., and Morrow, A. G.: The detection of intracardiac thrombi using radio-iodinated antifibrinogen (RIAF) and precordial scanning. Ann. Surg. 166: 173-182, Aug. 1967.

Table 1. Clinical Diagnostic Procedures

	FY 1967	FY 1968	Increase
Brain scan	774	805 [a]	
Liver scan	558	636	
Bone scan	366	380	
Lung scan	90	102	
Thyroid uptake	372	249 [b]	
Thyroid scan	150	144	
Renograms	54	282 [c]	
Renal scan	60	153 [c]	
Spleen scan	42	324 [d]	
Blood volume	30	14	
Bone marrow scan	0	63	
Miscellaneous studies	132	94	
TOTAL STUDIES:	2,628	3,246	23%

---

a. Includes brain scans and cisternograms.

b. Thyroid uptakes decline due to completion of ^{132}I uptake project (NIMH).

c. Increase in renograms and renal scans due to NCI project to evaluate early changes in renal function following abdominal irradiation.

d. Increase because this organ is now routinely scanned in two projections at the time of most liver scans.

Table 2. Whole body counter statistics

Clinical Determinations		Health Physics Bioassays	
^{40}K	438	^{32}P	69*
^{131}I	356	^{125}I thyroid	92
^{51}Cr	128	^{131}I thyroid	200
^{24}Na	107	Body Burden	159**
^{47}Ca	88		
^{57}Co	12		
^{82}Br	9		
Total 1968	1138	Total 1968	520
Total 1967	1291	Total 1967	210

*^{32}P measured by bremsstrahlung

**Body burden counts employ counting a wide gamma energy spectrum.

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

NURSING DEPARTMENT

CC-51
Serial No.

TABLE OF CONTENTS

Program Goals Nr-1

Progress Made Nr-1

Development and Trends Nr-4

Major Problems Nr-5

Accomplishments Nr-6

Publications Nr-7

Tables:

1. Hours of Continuous Nursing Care Provided by Each Nursing Service, May 1, 1967, to April 30, 1968 . . . . Nr-8
2. Number of Hours of Nursing Care Given by Part-Time Professional Nurses (WAE) on Each Nursing Service, May 1, 1967, to April 30, 1968 . . . . Nr-9
3. Number of Hours of Nursing Care Given by Part-Time Professional Nurses (WAE) on Each Nursing Service, Fiscal Years 1967 and 1968. (For comparison) Nr-10
4. Number of Hours of Overtime by Service, May 1, 1967, to April 30, 1968 . . . . Nr-11
5. Total Hours of Nursing Care and Average Number of Hours of Nursing Care per Patient per Day Provided by Each Nursing Service, May 1, 1967, to April 30, 1968 . . . . Nr-12
6. Accessions and Separations by Grade, May 1, 1967, to April 30, 1968 . . . . Nr-13
7. Statistics, Operating Room, May 1, 1967, to April 30, 1968 . . Nr-14
8. Diagnostic X-ray Procedures, Admissions and Followup Nursing Service, May 1, 1967, to April 30, 1968 . . . . Nr-15

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

NURSING DEPARTMENT

CC-51
Serial No.

PROGRAM GOALS

To provide, with the staff available, thoughtful, intelligent, and high quality nursing care to patients.

To aid in the achievement of clinical research goals by providing competent nursing assistance to the clinical investigators of the various Institutes.

To improve differential judgment of the professional staff in determining priorities for care and research when demands are not commensurate with staffing.

To maintain an ongoing program of analysis and evaluation in the area of patient care and personnel development in order to make the best possible use of available personnel.

To develop an organizational pattern for the various nursing units that will meet the existing patient and research needs in the most efficient way possible but which is not necessarily uniform on every unit.

To recruit the caliber of nurse needed to direct and give the quality of care needed for clinical research.

To promote further unification and coordination of all nursing activities with the aim of acquiring improved nursing care of patients and a knowledgeable and interested group of employees.

To further develop the individual members of the senior administrative nursing staff toward mature decision making based upon broad principles and expanded comprehension of administrative responsibility related to administrative authority.

PROGRESS MADE

In reviewing accomplishments of the Nursing Department during FY 1968 there were certain satisfactions accompanied by some disappointments. As was anticipated, the demands for nursing service were consistently greater than could be met with the available personnel. In our efforts to meet these needs, all categories of personnel demonstrated a commendable degree of cooperation, interest, and dedication.

The results were eminently satisfactory in that all patients received the essential elements of required care, and nursing support for clinical research was as much as it was possible to provide. We feel that our efforts to provide a continuing evaluation of resources made it possible to achieve an intelligent distribution of time and effort on the nursing units. There is considerable satisfaction in reporting that the majority of physicians were most cooperative in establishing the priority review method of meeting problems when personnel shortages were acute.

In an effort to accomplish one of the goals established for FY 1968 the administrative staffs, both junior and senior, regularly reviewed the total program demands, resources, and routines in an effort to highlight deficiencies and take appropriate actions. As a result of these efforts there were some developments which proved to be very beneficial. They include:

1. Repeated discussions of the purpose of the Nursing Department placed major value on the bedside care of patients. This effort was considered necessary to maintain a proper perspective for all categories of personnel and to emphasize the direction of activity when pressures were excessive.

2. Emphasis was placed upon the specific accomplishments resulting from good care of patients and a general effort was made to recognize individual contributions in this direction.

3. There appeared to be a better system of communication between the representatives of nursing service administration and physicians in the clinical areas which helped avert crises on several occasions. Frequently, misunderstandings arise from incorrect or lack of information. A decided effort was made to provide a direct approach to the proper source for enlightenment and appropriate action.

4. Encouragement of staff members to be individually responsible for identifying areas in which they could add to their basic knowledge and skills and then providing a climate which encouraged the use of these improved skills.

5. Use of small group meetings provided for the identification of individuals and allowed free expression of ideas which pointed the way toward needed revisions in the Nursing Department.

6. Establishment of schedules for individual conferences with staff nurses in an effort to better understand their views of the Clinical Center and to interpret the administrative position in nursing. Members of the senior administrative staff participated in this program which was initiated in January 1968.

7. The Clinical Research Nurse continued to broaden her scope of activity. There were 11 nurses in this category and their contribution to quality patient care cannot be measured. There were increasing demands for their time by physicians who needed assistance with nursing-related problems, the new staff nurses found working with them in their beginning assign-

ments easy, educational, and satisfying; the patients who received individual attention were loud in their praises; and the head nurses found that they were relieved of many of the details of patient and new employee orientation which were formerly half accomplished and frustrating.

8. By placing tape recorders on every unit, communication between the nursing staffs on the different tours was improved. Reports on most of the units were taped and necessary information for oncoming nurses was taped as well. In this way continual reference can be made to the original information. Use of the tape recorders was very satisfactory and will be expanded.

9. On two units of the Clinical Center studies were initiated to determine the approach to reorganization of unit routines. Each unit began trying a different pattern of organization designed to make better use of time and abilities.

10. Centralized time planning was initiated for each nursing service and the results were encouraging.

The inservice education programs for the Nursing Department and the individual nursing services were designed to meet current needs and to interpret, as much as possible, the results from ongoing clinical research activities. This aspect of nursing service administration received considerable attention during the past year as we tried to base our programs on needs expressed by staff members. This is consistent with our belief that all employees perform better when they are an integral part of the planning program and the agency profits from their interest.

Our recruitment program continued to provide satisfaction both in the results obtained from staff nurses representing the Clinical Center in schools of nursing and in the professional development of the nurse as she represents the employing agency. Thirty visits were made to schools of nursing during the past twelve months. Many of the visits were initiated by faculty in schools that had had prior representatives from the Clinical Center.

A workshop for head nurses was held in October 1967. The theme of the workshop was communication and the content appeared to meet the needs of the head nurses. As is customary, the Inservice Education Committee planned the workshop around ideas expressed by the head nurse group.

The workshop on personnel evaluation was again conducted in 1967 for senior staff nurses who had not been oriented to this type of responsibility.

As was reported in the Annual Report for 1967, an ongoing program of review for training programs was initiated. This year there was a revision of the training program for the GS-2 nursing assistants with elimination of many procedures which were not necessary for beginning workers. We revised our messenger and escort service for greater efficiency and the GS-2 nursing assistant was trained in line with these activities.

The Chief, Nursing Department, continued to keep in close communication with the Clinical Directors, with the aim of preplanning for future needs and cooperative review of current problems. The degree of understanding and assistance from this group was very much appreciated.

DEVELOPMENT AND TRENDS

As reported in 1967, there was a decided change in the type of patients admitted to the Clinical Center. In 1960 a survey was made of the patient population at which time 59% of the patients were fully ambulatory. In 1968 a survey of the patient population showed 74% of the patients to be essentially bed patients. These patients were frequently acutely ill and required much more individual attention than patients did in previous years. One expects the complexion of a research institution to change and the Nursing Department is charged with the responsibility of providing nursing care to patients undergoing clinical study so the increase in demand was handled in a professional manner. However, it makes the current accomplishments more significant when one compares the number of employees in the Nursing Department in 1960-617-with the number in 1968-529.

There is every likelihood that the competition for personnel will continue and we must concentrate on adapting new equipment and new techniques to the patient care area in order to conserve the time of nursing personnel for essential direct care to patients. The professional nurse just completing a program in nursing is well equipped in the theoretical aspects of nursing care but many young graduates must develop the skills of patient management from the experience of the first job. For this reason, the activities of the Clinical Research Nurse become increasingly important. During the past 2 years these nurses worked along with the new employees during the first few months of employment. This method of approach makes for easier adjustment on the part of the orientee, and better evaluation of weak areas for the Clinical Research Nurse with resulting correction.

There was a noticeable increase in the demand for continuous care of patients. Whenever possible, two patients requiring continuous care were placed in the same room so that one nurse could take responsibility for both patients. In the care of the child on the Lesch Nyhans Study, it was impossible to have one nurse care for two patients since she was kept constantly busy with the requirements of the study for one patient. The same can be said of the "Life Island" project, the postoperative heart patient, and many other clinical investigations.

In this connection it seems evident that a better plan of organization or a curtailment in the program is needed. It is financially impossible to plan for the continuous care of a large segment of the patient population and it is practically impossible to secure the number of nurses needed for this demand. Through preplanning and the cooperative understanding of the physicians, it is possible to establish a reasonable norm for continuous care on a daily basis which, at the end of FY 1968, seemed to be the only logical solution to this mounting problem.

The turnover rate of staff continued to be high with resulting increased demands on the training officers. Retention of staff, especially the professional nurse group, created a major challenge. The increase in salary scale for professional nurses, effective January 1, 1968, proved to be of help in recruitment and hopefully will have an effect on retention. Encouragement of the professional development of the staff nurse is also directed toward a better retention record. However, it should be recognized that the demand for the professional nurse increases as the number of diploma schools of nursing decreases and the struggle to maintain quality nursing care for research patients is not likely to become any easier.

In our annual review of the Nursing Department we discussed the use of the professional and the practical nurse. The concensus is that the professional nurse is needed in sufficient numbers if quality care is to be provided for patients and intelligent assistance is to accompany research designs. The practical nurse is a valuable adjunct but cannot, in the majority of cases, be utilized for complete responsibility in the clinical research situation.

MAJOR PROBLEMS

1. Again, the major problem for the Nursing Department was the shortage of personnel.

2. There were several situations during the past year when morale was very low and resentment high. The reason for the tension was the amount of evening and night duty required of all staff members.

3. The demand for continuous care of patients was an ever-increasing problem for which there is no ready answer.

4. The usual procedure for transferring leukemic patients in remission to the SACP program created some problems on the Cancer Nursing Service. When nurses are constantly in contact with the acutely-ill or dying patient the emotional stress is high. On several occasions the emotional drain on individual nurses reached a crisis stage and we had to make emergency adjustments in staffing to avoid extreme trauma.

5. Variations in schedule for surgical patients presented many problems for the nursing units. An attempt is currently under way to establish a stable schedule which will provide for a more even demand on nursing time over the 7-day week.

6. Studies requiring exact techniques and detailed observation increased during the past year with resulting increase in time devoted to instruction on the nursing units.

7. Space continues to be a problem. There is inadequate storage space on all of the units where equipment increases and the storage space is utilized for non-unit storage. It is increasingly difficult to find conference space for large group meetings and many of the training activities must be adjusted to the occurrence of vacant rooms on the nursing units.

8. Recruitment in all categories of personnel is a very real problem. We

are greatly affected by the lack of male nursing assistants.

9. Parking continues to be a very serious problem.

ACCOMPLISHMENTS

1. A complete review of all activities in the Nursing Department was accomplished during the past year with resulting change in activities as indicated.

2. The establishment of a cooperative review routine for head nurses and physicians resulted in a priority system for periods of stress which safeguards the patient and protects the clinical studies.

3. The establishment of a position which permits central scheduling on all nursing units proved to be a great asset to the Nursing Department.

4. The inservice education program was expanded during the past year to increase the information provided for staff while decreasing the number of persons removed from the nursing units at any one time.

5. A monthly calendar of nursing events was instituted in October 1967.

6. In an effort to streamline the procedures and save time for personnel, a review of some of the more elaborate procedures now used by nurses was initiated.

7. A series of demonstrations was arranged for students in local schools of nursing in order to familiarize them with the Clinical Center and to interpret the nursing aspects of clinical research.

8. A statement of beliefs with regard to professional nursing at the Clinical Center was prepared by a committee of professional nurses following publication of the position paper by the American Nurses Association in 1966. Reaction of the nursing staff to the action of the American Nurses Association was such that the Nursing Administrative Council felt a written statement for the Clinical Center was needed.

9. In September 1967 a routine for the annual review of the most used techniques in research protocols was initiated and will be continued each year. Among those techniques reviewed were external cardiac massage and rediation safety.

10. Initiation of two plans for reorganization of routines on two nursing units was stimulating to nursing staff and moderately effective in better use of personnel. The studies are too new to properly evaluate results.

11. Seminars for staff nurses and team leader conferences continued to improve the communication between the nursing services and the Central Nursing Office.

12. A conference of outstanding administrators of nursing services was held

at the Clinical Center in November 1967. Purpose of the conference was to review the problems of nursing service administration and to supply some solutions to the most pressing problems.

PUBLICATIONS

Anderson, L. C., and Himmelsbach, C. K.: The nurse: first line of defense against infections. Hospitals 41: 84-98, Oct. 1967.

Lunceford, J. L.: Leukemia disease process, chemotherapeutic approach, and nursing care. Nurs. Clin. N. Amer. 2: 635-647, Dec. 1967.

Levitan, A. A., Seidler, F. M., Strong, C. D., and Herman, L. G.: The role of supportive services in the operation of an isolator system. JAMA 203: 105-110, Mar. 18, 1968.

Zell, Z., Snyder, C., Mink, M., and James, C.: Nursing care of patients with pheochromocytoma. A nursing clinical conference. U. S. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health. Washington, D. C., U. S. Government Printing Office, 1968, 16 pp.

Seipp, C. Y., Stahler, M., Ketcham, A. S., Barnett, R., Vreeland, R., and Dunn, K. L.: Hemipelvectomy with total pelvic exenteration; the challenge and the response. A nursing clinical conference. U. S. Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health. Washington, D. C., U. S. Government Printing Office, 1968. In press.

Table 1
Hours of Continuous Nursing Care Provided by Each Nursing Service
May 1, 1967 - April 30, 1968

Nursing Service	May 1, 1967 April 30, 1968 Hours
Allergy and Infectious Diseases Nursing Service	2,255.00
Arthritis and Metabolic Diseases Nursing Service	7,679.50
Cancer Nursing Service	15,321.00
Heart Nursing Service	17,526.50
Neurology Nursing Service	7,436.75
Psychiatric Nursing Service	4,354.50
Total	54,573.25
Number of man days	6,821.65
Number of man years	26.04

Table 2
Number of Hours of Nursing Care Given By Part-Time Professional Nurses (WAE) On Each Nursing Service
May 1, 1967 - April 30, 1968

Nursing Service	May 1, 1967 April 30, 1968
	Hours
Admissions and Followup Nursing Service	40.0
Allergy and Infectious Diseases Nursing Service	2,217.5
Arthritis and Metabolic Diseases Nursing Service	9,313.5
Cancer Nursing Service	31,878.5
Heart Nursing Service	10,517.0
Neurology Nursing Service	9,613.5
Psychiatric Nursing Service	1,726.5
Education and Training (Orientation)	1,763.5
Total	67,070.0
Number of man days	8,383.75
Number of man years	32.00

Table 3
Number of Hours of Nursing Care Given By Part-Time Professional Nurses (WAE) On Each Nursing Service

Fiscal Years 1967 and 1968
(For Comparison)

Nursing Service	1967	1968
	Hours	Hours
Admissions and Followup Nursing Service	2,189.50	40.00
Allergy and Infectious Diseases Nursing Service	934.50	2,217.50
Arthritis and Metabolic Diseases Nursing Service	7,355.00	9,313.50
Cancer Nursing Service	25,914.00	31,878.50
Heart Nursing Service	11,441.50	10,517.00
Neurology Nursing Service	8,899.50	9,613.50
Psychiatric Nursing Service	2,278.00	1,726.50
Education and Training (Orientation)	1,345.00	1,763.50
Total	60,357.00	67,070.00
Number of man days	7,544.62	8,383.75
Number of man years	29.02	32.00

Table 4
Number of Hours of Overtime by Service
May 1, 1967 - April 30, 1968

Nursing Service	May 1, 1967 April 30, 1968
	Hours
Admissions and Followup Nursing Service	641.50
Allergy and Infectious Diseases Nursing Service	1479.00
Arthritis and Metabolic Diseases Nursing Service	1118.00
Cancer Nursing Service	4164.00
Heart Nursing Service	794.00
Neurology Nursing Service	1985.00
Psychiatric Nursing Service	2213.50
Surgical Nursing Service	1746.00
Central Nursing Office	391.00
Total	14,532.50
Number of man days	1816.56
Number of man years	6.93

Table 5
Total Hours of Nursing Care and Average Number of Hours of Nursing Care per Patient per Day Provided by Each Nursing Service
May 1, 1967 - April 30, 1968

Nursing Service	Number Patient Care Days	Professional GS-5-6-7 Hours of Nsg. Care	Non-professional GS-2-3-4-5 Hours of Nsg. Care	Total Hours Nsg. Care	Avge. Hrs. Nsg.Care per patient per day		
					Professional	Non-professional	Tot.
Psychiatric	15,542	58,459.5	41,086.0	99,545.0	3.76	2.64	6.40
Neurology	20,122	53,079.0	46,713.5	99,792.5	2.64	2.32	4.96
Heart	27,477	78,800.5	60,881.5	139,682.0	2.87	2.22	5.08
Arthritis & Metabolic Diseases	16,410	50,553.0	43,346.0	93,899.0	3.08	2.64	5.72
Allergy & Infectious Diseases	11,880	26,340.0	21,435.0	47,775.0	2.22	1.80	4.02
Cancer	38,566	134,359.5	84,452.5	218,812.5	3.48	2.19	5.67
Grand Total	129,997	401,591.5	297,914.5	699,506.0	3.09	2.29	5.38

Table 6
Accessions and Separations by Grade
May 1, 1967 - April 30, 1968

Grade	Accessions	Separations
Supervisory Clinical Nurse GS 10	1	4
Supervisory Clinical Nurse GS 9	1	2
Clinical Nurse GS 7	71	85
Clinical Nurse GS 6 and Nurse GS 5	58	41
Secretary GS 5 and GS 4	1	3
Unit Clerk GS 4, 3, and 2	53	36
Practical Nurse GS 4 and GS 3	11	11
Nursing Assistant GS 2, 3, 4, and 5	78	61
Total	274	243

Table 7
Statistics, Operating Room
May 1, 1967 - April 30, 1968

Cardiac Catheterizations	No.	Plasmapheresis	No.
May	62	May	24
June	63	June	30
July	61	July	35
August	49	August	48
September	46	September	42
October	48	October	58
November	60	November	45
December	41	December	54
January	50	January	53
February	46	February	46
March	61	March	30
April	36	April	56
Total	623	. . . .	521

Number of Patients Going to Surgery
Classified by Institute

National Institute of Allergy and Infectious Diseases	35
National Institute of Arthritis and Metabolic Diseases	100
National Cancer Institute	620
National Institute of Dental Research	11
National Heart Institute	308
National Institute of Mental Health	4
National Institute of Neurological Diseases and Blindness	300
Total	1378

Table 8
Diagnostic X-ray Procedures
Admissions and Followup Nursing Service
May 1, 1967 - April 30, 1968

Month	Number
May	95
June	85
July	47
August	60
September	53
October	85
November	83
December	67
January	87
February	85
March	69
April	65
Total	881

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

NUTRITION DEPARTMENT

CC-61
Serial No.

TABLE OF CONTENTS

Contributions to the Clinical Research Programs Nt-1

Accomplishments, Changes, and Improvements Nt-5

Major Problems Encountered Nt-6

Publications Nt-8

Awards Nt-8

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

NUTRITION DEPARTMENT

CC-61
Serial No.

CONTRIBUTIONS TO THE CLINICAL RESEARCH PROGRAMS

Because of the research mission of the Clinical Center, the role of its Nutrition Department is necessarily unique. This department assumes responsibility for providing dietary services to support a wide variety of research programs as well as full responsibility for food service to all patients (516).

The Nutrition Department's contribution to the research programs involves the control of patient dietary intake, as ordered by research investigators, and the provision to investigators of precise and complete patient intake data.

This department makes its contribution to the clinical research programs in providing precise and complete data on patient nutrient intake to assist research investigators in such activities as:

I. Interpreting the mode of action of new drugs.

II. Seeking additional knowledge of diseases for the purpose of developing new means for their treatment or management.

III. Evaluating the course of a disease or the status of a patient.

IV. Diagnosis.

The Nutrition Department's services for the year 1967-68 fall into five major areas. The most predominant has been:

A. That of providing control of patient dietary intakes with the provision of precise and complete data on patient intake. Each of these are in accordance with specific orders of the various clinical investigators. The ability of this department to provide controlled dietary intakes has contributed to the successful investigation of a number of programs. A few examples are:

1. The National Institute of Arthritis and Metabolic Diseases reported in a recent newsletter to the Surgeon General that several of its scientists had shown that a partial loss of an enzyme of purine metabolism-hypoxanthine-guanine phosphoribo-syltransferase is associated with excessive purine synthesis in some gouty individuals. To arrive at this, purine biosynthesis was evaluated by measuring uric acid excretion, uric acid pool, and turnover. This required

services of the Nutrition Department to provide a controlled diet adequate in protein to provide nitrogen equilibrium in each patient studied and at the same time, a diet low in purine, palatable and acceptable over long periods of time.

2. Another study, by the National Institute of Neurological Diseases and Blindness, required the controlled amounts of fat to make it possible for the investigators to study plasma lipids in epileptic children treated with high fat diets. This controlled diet has to be adequate in protein, high in fat and low in carbohydrate, usually with a ratio of 4, 3, or 2 grams fat to 1 gram of carbohydrate and protein combined. This is an adaptation of the ketogenic diet. This work was reported in the Archives of Neurology, Vol. 15, pages 177-184.

3. The National Heart Institute required this type of service for a majority of its patients this year:

    a. Considerable patient days were spent in studying defects involving phytanic acid metabolism in Refsum's Disease. The diet had to be planned at the lowest possible level of phytol for long term regimes (6 to 12 months). The diet finally selected was a constant intake of 2 grams phytol daily.

    b. Another was the study of patients with scleroderma with the use of a high copper diet (30 milligrams). Investigators were able to document the effect of high copper (10-15 times normal) dietary intake in patient's attenuated sense of taste (also believed to be secondary to d-Penicillamine). At the end of 4 weeks' study the investigators reported a significant use in patient's sensitivity to taste test solution and the patient reported subjective improvement in her ability to taste. It is reported by investigators that this response may well have widespread ramification in much of research concerned with mechanics of taste to be studied in the future.

    c. A double blind study was undertaken to evaluate the potential of Atrimid in lowering blood cholesterol and tryglycerides while maintaining the patient's weight constant and at the same time on a cholesterol intake below 100 milligrams. This is a study of at least 3 months' duration. The calorie intake usually had to be adjusted eight to ten times in order to maintain a patient's weight. In addition to the above, the diet was iso-caloric with source of calories maintained at 20% protein, 40% fat, and 40% carbohydrate.

B. Area two involved work with normal controls or volunteers to establish controls for specific research projects. Work with normal controls in establishing base lines for clinical research programs by the Institutes involved the Nutrition Department in a majority of the studies. As may be anticipated, the National Heart Institute is the predominant user of these services. Some typical examples of volunteer studies are given below:

Diet Order	Significance and Use of Diet
Neutral Ash Diet 9 milliequivalents sodium	These normal controls were admitted primarily for renin studies, but as is often the case, the diet was determined initially to fit the parameters of more than one study, thus permitting more economy of time and effort. In this case the neutral ash requirements permitted a Vitamin C study, a sensitivity test, and tryptophane loading test, without further dietary modification. The renin study involved the administration of angiotensin infusions at various sodium levels to determine the effect of renin production, and required modifications of the sodium level from 250 to 9 milliequivalents.
Fat Tolerance Test Fat tolerance tests consist of a breakfast formula high in unsaturated fat contain ing 98 gm. fat, 17 gm. protein, 11 gm. carbohydrate, and 80 mgm. cholesterol. Lunch and dinner consist of remaining isocaloric requirements - 35% derived from protein and 65% derived from carbohydrate, with 5 gm. of fat as on the high carbohydrate regimen.	Normal volunteers on a study for evaluating serum cholesterol and tryglycerides.
Constant Protein Low Amine Diet (Separate menu planned for each volunteer incorporating low amine modification of constant diet foods. All food served must be consumed. Menu remains the same throughout study period.)	Normal volunteers participating in drug response study of Experimental Therapeutics Branch investigators.
Neutral Ash Diet 300 mg. Phosphorus, Low Collagen (Devising a neutral ash diet with a low phosphorus content that meets the caloric and protein requirements of a patient is extremely difficult.)	Normal volunteers placed on the diet to determine the effect of phosphorus depletion on serum and urinary phosphorus. While on the diet the volunteer is given Amphogel - Maalox to tie the phosphorus given in the diet. After getting the patient on control, glucose tolerance test, renal concentration tests and ammonium chloride loading tests are performed, hydroxy-proline excretion is also measured as part of the study.

C. The third area is unique in that the patient's diet must be planned to assure accuracy of the laboratory analyses of end products (urine and feces). For example, all patients studied by the Gastroenterology Service of NIAMD are ordered on a diet containing at least 100 grams fat to insure the laboratory of an accurate stool assay. Calorie intakes are calculated daily. Other dietary restrictions are often superimposed on this particular requirement.

Another example is the constant neutral ash diet, 109 mEq sodium, 800 mg phosphorus, ordered by National Heart Institute investigators in their study of Sjogren's Syndrome to determine the incidence of renal tubular acidosis in this disease. This also required that a duplicate tray of the food served to the patient be sent to the laboratory for analysis.

D. The fourth area has been to provide a "sterile diet" for use by the Leukemia Service of the National Cancer Institute. To assist with treatment and evaluation of the "Life Island" for treatment it has been necessary to render the patient and his environment as sterile as possible so that maximum treatment could be implemented. This requires more than standardization of procedures and preparation of a wide variety of food items to be in an acceptable form and sterile--it also has required adaptation to each patient studied to his individual food preferences, and to the changing health status of the patients. At the same time, assistance has been given to the study of a like patient outside of the Life Island maintained with sterile food. The sterile diet now appears to be the vital key to the success of this research program.

E. Last, but not least, number 5 area is the requirement of providing an individualized food service of high quality and one that meets the individual tastes so that the patient can adapt readily and happily to the research environment, and maintain his diet needs for control or treatment of his disease. These are numerous and involve a wide variety of orders. Typical examples are:

1. A low methionine diet for the treatment of cystinuria.

2. 40 mEq sodium, bland diet, 6 feedings, for patient with congenital heart defect and gastric ulcer.

3. 1000 mg sodium diet for patient with carcinoid syndrome admitted for drug therapy.

4. 30 mEq sodium diet--patient with rheumatic heart disease admitted for pre-surgical evaluation.

5. 20 mEq sodium diet--patient with mitral stenosis admitted for evaluation and correction of severe edema prior to surgery.

6. Bland diet--patient with aplastic anemia admitted for splenectomy. Bland diet ordered due to a history of gastrointestinal bleeding from lower bowel and current episodes of hematemeses.

7. Low residue diet--patient with Hodgkins disease with a manifestation of G.I. problems due to radiation therapy, e.g. nausea, diarrhea, and abdominal cramping.

8. 500 mg calcium diet--patient with multiple myeloma with bone involvement. The low calcium diet was due to a diagnosis of hypercalcemia.

9. Egg-free diet--patient with specific allergy. Required many recipe adaptations.

10. Puree diet--patient with long standing aphthous stomatitis; wears a prosthetic device which enables him to breathe only through his mouth, thus making it difficult to eat anything that requires thorough mastication. Also, he has no epiglottic reflex. Most of his food must be blended to a very fine and "soupy" consistency.

These are just a few examples; the Nutrition Department's support, through the application of diet therapy and research techniques, provides an integral part of all of the research programs conducted in the Clinical Center.

ACCOMPLISHMENTS, CHANGES AND IMPROVEMENTS

One of the most important accomplishments of the Nutrition Department is the care and attention given to patients as individuals. Very ill patients are visited before each meal by Nutrition Department personnel and encouraged or coaxed to eat; diets are rewritten and recalculated to accommodate food preferences and whims of patients; new patients are interviewed by dietitians to assure that the patients' food preferences are allowed in their diets; special foods are purchased and served to encourage eating; the department covets the inherent ability of a hospital food service department to boost the morale of the patient.

In FY 1968, the Nutrition Department served 333,310 patient meals and calculated and recorded patient food intakes for an average of 91 patients daily. This involved weighing at least 3 to 6 trays of food, and 2 to 3 nourishments, for each patient. The Nutrition Department gave individual discharge and follow-up diet instruction on 565 occasions.

In addition, the Nutrition Department measured total day's fluid intakes for an average of 56 patients each day during the year, and sent a total of 664 days' diet aliquots to laboratories on request.

Twelve floor kitchens, a "Life Island" service kitchen, a formula room, the main kitchen, 3B (NCI) and 9th (NIAMD) metabolic units operated the full 12 months of FY 1968. The 8th (NHI) metabolic kitchen operated only 11 months. It was closed June 15, for a month, for staff vacations.

Because of the increased need for bland diets (due in part to the results of treatment with a number of new medications) a cycle bland menu was initiated this year.

Special menus for Thanksgiving and Christmas were continued.

During the year, the Nutrition Department provided a two-week affiliation period for each dietetic intern enrolled in The American Dietetic Association approved internship course of the United States Public Health Service Hospital, Staten Island, New York. These two weeks are devoted to learning experiences of dietetics in research as opposed to general medical care. Interns came to the Clinical Center in five groups of two interns each. Three groups attended October through December, and two, February through March.

One metabolic conference was held in fiscal year 1968. Eight dietitians representing eight medical centers, as well as four members of the Clinical Center Nutrition Department professional staff, participated.

A manual for the operation of a metabolic kitchen unit was completed and sent to the Government Printing Office. It is anticipated that this manual will be in great demand. It describes in detail the procedures as they are used by the three metabolic units of the Nutrition Department.

A fifteen minute color movie, prepared as a training film for use in the training program of the Nutrition Department, was completed in conjunction with the Plant Safety Branch. The script was written by Mrs. Esther Namian, Food Production Dietitian, using pictures of employees of this department. It has been placed with CDC for distribution to others for use in nonprofessional training programs.

The Department operated for a full year under the terms of the negotiated agreement between NIH and the AFGE, Lodge 2419. The new procedures initiated last year to comply with this agreement were used again this year, with a minimum amount of unrest generated.

The Clinical Center cafeteria, operated by the Nutrition Department, was phased out on February 9, 1968. As a result of two years of planning, all the 43 positions eliminated were staffed at the end with temporary employees, and thus no career conditional employee had to be "reduced-in-force." There were, however, seven staff members who suffered reduction of grade, and thus pay, as a result of their reassignment.

MAJOR PROBLEMS ENCOUNTERED

The Nutrition Department's fluctuating and unpredictable workload continued to be one of its greatest problems. As indicated below, a wide variation occurs from month to month in the volume of diets provided.

Total Patients Serviced-1967 Compared with 1968

	1967	1968	
July	11,441	11,877	+ 436
August	11,402	11,440	+ 38
September	9,928	10,308	+ 380
October	10,520	11,846	+1,326
November	7,895	11,495	+3,600
December	10,384	10,031	- 353
January	10,775	10,230	- 545
February	11,080	10,594	- 486

An even wider variation occurred in the types and kinds of diets requested. Clinical Center patients in general were more gravely ill than those of previous years and required more therapeutic diets for their medical care needs as well as more dietary adjustment as part of their treatment. The number of diet changes requested for individual patients continued at a high rate on nearly every service. There was an average of 83 diet changes each day this past year. In addition, there was a decided increase in the number of trays (meals) that had to be held to be served at a later hour than originally scheduled. These averaged 75 delayed trays per day during this fiscal year.

Although cost figures are available for this report only through February 1968, increases in patient ration costs are evident. Increases in wage schedules of all employees, as well as generally rising costs of raw food and other supplies, were contributing factors. Limited utilization of two of the three metabolic kitchens for balance study diets also contributes to the high cost of Clinical Center patient rations.

Patient Ration* Costs

Fiscal Year:	1964	1965	1966	1967	As of 2/29/68
Personnel	$ 9.76	$10.23	$10.82	$12.34	$13.01
Raw Food	1.79	1.82	1.91	2.11	2.25
Sup. & Other	.39	.45	.44	.40	.39
Average Cost per Ration	$11.94	$12.50	$13.17	$14.85	$15.65

---

*A ration is defined as the equivalent of three meals.

The personnel cafeteria deficit, through closing February 9, 1968, was $11,619.24. This change was a desirable one. However, the transition brought its problems to the Nutrition Department. Within this period an additional eight Food Production Service employees were retrained for transfer to the Patient Dietetic Service in both supervisory and food service worker positions; new job routines and descriptions for all main kitchen positions were reconstructed and reclassified; and purchasing procedures were revamped to convert to purchasing and issuing approximately 150 items in smaller quantities.

In October 1967, because of a shortage of temporary employees available, plastic cutlery was introduced for use in the cafeteria, and menu items adjusted. Again on December 11, 1967, menu items served were further reduced eliminating all salads and reducing breakfast items to a minimum. Finally on January 29, 1968, the hours of service had to be limited to two meal hours until closing on February 9, 1968.

The Nutrition Department's formal training program for nonprofessional supervisors was curtailed again in fiscal year 1968 because of a shortage of professional staff, an unusual number of staff changes, and long-term illnesses. Separations totaled 43 during the year. This was influenced by the reduction in force and its effect, and primarily reflects expiration of temporary appointments.

Procuring canned food items which meet NIH specifications was increasingly difficult. Vendors were reluctant to have their deliveries subjected to NIH inspection system. In addition, many items ordered were in short supply and therefore in demand elsewhere.

PUBLICATIONS

Jones, E. A.: Goals for our next fifty years. J. Amer. Diet. Ass. 50: 503-507, Dec. 1967.

AWARDS

Miss Margaret V. Vance, Chief of the Food Production Service, was awarded the Public Health Service Commendation Medal in recognition of her outstanding accomplishments in the operation and expansion of the Food Production Service.

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

PHARMACY DEPARTMENT

CC-40
Serial No.

TABLE OF CONTENTS

General Ph-1

Radiopharmaceutical Service Ph-1

Pharmaceutical Development Service Ph-3

Pharmacy Service Ph-5

Central Sterile Supply Service Ph-7

Office of the Chief Ph-8

Professional Activities Ph-9

Publications Ph-11

Table 1: Pharmacy Department Statistical Data Ph-13

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

PHARMACY DEPARTMENT

CC-40
Serial No.

GENERAL

The Pharmacy Department is composed of: the Radiopharmaceutical Service, responsible for developing, preparing, quality control testing, and dispensing of radionuclidic dosage forms; the Pharmaceutical Development Service, responsible for registering and processing investigational drugs and development and assay of investigational drug dosage forms; the Pharmacy Service, responsible for issuing drugs and prescriptions to both inpatients and outpatients; the Central Sterile Supply Service, responsible for processing and issuing sterile and clean supplies used in the administration of medications, treatment of patients, and other activities; and the Office of the Chief, responsible for administration of the Department, orientation of new personnel, and provision of centralized purchasing activities for the several Services.

Moderate increases in workload were again noted in FY 1968. Certain aspects of the functions fulfilled by the Department were strengthened, although other long-range goals were not attained because of limitations of personnel, budget, and space.

RADIOPHARMACEUTICAL SERVICE

The areas of responsibility of this Service are four-fold: service functions, consultation, product development and control.

Service functions include those procedures which have become more or less routine, such as a formulation technique in which a radioactive chemical is dissolved in a suitable solvent, packaged, and sterilized, or, in other cases, a simple aseptic dilution of a commercially-procured radiopharmaceutical. Product development activities involve originating products to meet a specific diagnostic, tracer, or, occasionally, therapeutic need. Control functions are concerned with a variety of observations, tests, and analyses to which a product, regardless of its origin, may be submitted to establish the pharmaceutical or medicinal quality of that product and, at times, to determine its efficacy. Consultative functions involve communication with NIH professional personnel, as well as members of the scientific communities of civilian and governmental institutions, both domestic and foreign.

Although the work units completed by the Radiopharmaceutical Service have more than doubled in the past four years, an analysis of the workload statistics of this Service for the past two years indicates that maximum output with existing personnel, space and equipment has been reached. As was the case last year, many requests for assistance submitted by authorized clinical investigators, particularly those interested in product development, were delayed for periods of time approaching three to four months. Others were simply rejected because of insufficient personnel time or space to devote to such activities. The decrease in the product development aspects of this Service is indicated by the fact that only 3.8% of the total personnel time available during FY 1968 could be devoted to this type of activity.

Quality control procedures, on the other hand, occupied more of the professional time than last year. About 50.4% of all requests for assistance and 61.6% of all work units completed by the Radiopharmaceutical Service in FY 1968 were in the control category. The need for adequate quality control on radiopharmaceutical products has been repeatedly emphasized in annual reports from this Department for a number of years. It has also been emphasized that due to serious limitations of personnel, space, and equipment, it is impossible to provide the degree of quality control on these radioactive dosage forms that is required by federal statute and conditions of USAEC licensure.

The importance of quality control procedures can be illustrated in a number of ways. For example, the renewal of the USAEC By-Product Material License, under which the National Institutes of Health procures, possesses, amd uses radioactive material, was facilitated during the past year through the submission of a number of Radiopharmaceutical Service protocols in which manufacturing and quality control procedures were specified. Information of this nature assures compliance with Condition Number 13 of the USAEC license, which states that by-product material shall not be used in humans until its pharmaceutical quality and assay have been established.

In addition, a number of radiopharmaceutical products procured from commercial sources, supposedly in a ready-to-use form, have been rejected for failure to meet specifications. Examples of these include Hg-197 labeled chlormerodrin, rejected because of a high inorganic Hg-197 content, and several batches of macro-aggregated human serum albumin labeled with I-131, which were not acceptable because of excessively large aggregates (larger than 200 microns) and unduly high levels of non-organically bound I-131.

Finally, the quality of many of our "in-house" produced dosage forms is frequently impossible to assess adequately. The sophistication of the research projects, in which our products are used, demands extreme purity and an accurate quantitative determination of all product constituents. Frequently these unusual demands cannot be met becuase the required instrumentation, personnel, and the space in which to house either of these, are not available. Another factor is the Radiopharmaceutical Service's responsibility to provide a wide variety of radiopharmaceutical dosage forms to clinics and laboratories of the various Institutes in which there is already a heavy investment in personnel and equipment. Thus, it can be seen that the National Institutes of Health, under these conditions, can never realize its full potential in the areas of excellence and new product development. In a wider frame of reference, it also means that the rest of the national and international scientific community that looks to the National Institutes of Health for guidance in such areas as Nuclear Medicine and Radiopharmaceutical Development cannot expect to see the degree of excellence and leadership in these areas that should prevail at an institution that has established this reputation.

Although it has previously been mentioned that product development activities were seriously curtailed during the past year, one new product has been developed. In preliminary clinical trials, it shows considerable promise. One of the most difficult organs from which to obtain satisfactory scans in Nuclear Medicine has been the liver. Because roentgenographic visualization of the liver is not possible, this organ presents one of the most important problems from a Nuclear Medicine standpoint. During the past year, the Radiopharmaceutical Service has developed a new liver scanning agent, microaggregated human serum albumin labeled with Tc-99m. In initial clinical trials, a remarkably diminished splenic uptake of this agent, when compared with other liver scanning agents now available, has been noted. This makes possible a much more definitive scan of the left lobe of the liver, which frequently is shaded by high splenic localization of other liver scanning agents. It is postulated that the degree of splenic uptake is a function of both the colloidal size and the mass of colloid administered. Continued clinical use of this material may indicate a real breakthrough in this difficult scanning problem.

Consultations between staff members of this Service and the NIH intramural staff have frequently resulted in safer and more effective use of radionuclides in clinical research projects. Again, during this past year, extramural attention has been directed toward the Radiopharmaceutical Service; many nuclear medicine departments and medical school staffs have consulted this Service on matters relating to the safe formulation of radiopharmaceutical products. At a national symposium convened to study methods of reducing radiation dose in nuclear medicine procedures at Michigan State University in August 1967, repeated references were made to the Clinical Center Radiopharmaceutical Service as a group with the expertise so desperately needed in other hospitals throughout the nation.

Thus, as in past years, the major problems encountered by this Service are those posed by lack of sufficient personnel, space, and equipment to properly carry out the mission and responsibility inherent in its operation. It is abundantly clear that additional staff and space, as well as a more complete investment in instrumentation, will be required if this Service is ever to realize its potential. Indeed, additional workload without these will be impossible to accept.

PHARMACEUTICAL DEVELOPMENT SERVICE (PDS)

Responsibilities of the Pharmaceutical Development Service are: registration and control of investigational new drugs; formulation and development of finished dosage forms; assay and quality control of investigational new drugs used in Clinical Center patients; and, preparation of analytical data sheets for submission to FDA and DBS.

During FY 1968, the following units were formulated into dosage forms:

Capsules	69,553
Injections	27,825
Tablets	10,000
Others	3,928
Total	111,306 units

This Service, however, should be more than just a service unit. Increased amounts of research must be conducted if we are to keep pace with the newest hospital technology. New ideas, theories, and methods must be tested and evaluated if we are to make progress.

In 1967, the FDA was able to process 25 New Drug Applications (NDA) for single chemical agents and approve these drugs for sale as compared with 14 NDA's in 1966 for similar items. Among the 25 releases in 1967, there were 14 new molecules, 3 derivatives, and 8 new salts. Of the 14 new molecules, 8 were registered with the Pharmaceutical Development Service for "investigational use" in Clinical Center patients prior to the approval of their NDA's. Many of these drugs were evaluated in double blind studies prepared and monitored by PDS and the principal investigators. In addition, the preparation and formulation of placebo matching drugs constituted a major contribution of the PDS in these various studies.

The general workload of the Pharmaceutical Development Service has again increased, due in part to the additional information required by the FDA with regard to drug safety and efficacy. Increased time was spent in assaying and quality control testing of products formulated prior to their release for patient use. The FDA now requires specific information to be included in analytical data sheets prepared by the PDS, or in the attachments that make up the Form FD 1571 (Notice of Claimed Investigational Exemption for a New Drug).

In the past year we updated and resubmitted to FDA data concerning our personnel, facilities, and controls for processing a new drug. We were also required to include additional information in the analytical data sheets, such as production and formulation records and copies of our labels.

Currently, FDA is also requiring storage stability data in order to determine the shelf-life of a product. Storage stability studies are extremely time consuming and were conducted in recent years by the Pharmaceutical Development Service only on a very superficial basis. With additional personnel and space, this aspect of our quality control program could be improved. More thorough studies would enable the pharmacist to predict how long a drug could be used before its degradation would make further use unwise or unproductive. Many programs carried out in Clinical Center patients have been invalidated due to the use of subpotent drugs. If good storage stability studies had been possible, this problem could have been avoided, with a saving in time and money.

The current controversy in the lay press and scientific literature concerning the relative merits of generic versus brand name drugs is assuming major importance. The question evolves around the point of whether or not generic drugs are the equivalent of the (usually) more expensive brand name entities. The NCI Drug Evaluation Branch's Screening Section has requested the Clinical Center Pharmacy to assist in setting up a program for determining drug safety and therapeutic efficacy for various dosage formulations used by NCI. The Pharmaceutical Development Service has submitted for testing in animals two drugs that have been formulated and are currently being used in studies involving Clinical Center patients. This program enables the PDS to better determine if the formulation procedure has in any way hindered or reduced the clinical efficacy of the drug. Correlation of chemical assays and testing with the results of animal testing also enables PDS to set standards on various drugs and dosage forms based on these parameters.

This type of program would materially benefit the Centralized IV Additive Section of the Clinical Center Pharmacy, where mixtures of several drugs are prepared for intravenous infusion. It would be possible from these studies to determine if costly drugs can be used in combination without loss of therapeutic efficacy. Present reports in the literature deal with physical or visible incompatibilities, rather than those which are of a chemical or therapeutic origin. In vivo testing would tend to support the chemical assays. The tightening of controls by in vivo testing should be considered not only for each initial commercial or PDS formulation, but for each subsequent batch or lot produced prior to release for human use.

Publications originating in the Pharmaceutical Development Service during this year have more widely proclaimed the existence and contributions to the clinical research program of the National Institutes of Health.

This Service is in a unique position to serve many of the existing needs in a diverse clinical research environment such as that represented by the Clinical Center. On a small scale, some programs fulfilling these needs and goals are presently in progress, but greater support in manpower, equipment, and space will be necessary if meaningful progress is to be made.

PHARMACY SERVICE

Seven groups (20 pharmacy officers) of USPHS Hospital Pharmacy Residents were trained in sterile extemporaneous compounding of bulk intravenous solutions. This training included a discussion of the administrative and technical problems encountered in providing such a service. Advantages of this service to the hospital were stressed, and operational methodology was discussed.

It was again noted during this year that larger quantities of drugs were being prescribed per patient at the time of discharge and on visits to the outpatient area. Excessive quantities of drugs may pose a poisoning hazard, the drugs may deteriorate due to improper storage by the patient, and the patient may become confused by multiple bottles (often duplicated by visits to the outpatient area) present in his medicine cabinet. In addition, the physician is frequently unaware of the quantities or the varieties of drugs already in a patient's home as a result of an outpatient visit to another Institute clinician. The increasingly larger sizes of prescriptions dispensed created packaging problems for the dispensing pharmacist and resulted in multiple problems of inventory control, as well as in procurement.

To overcome the safety problem, the policy of placing an expiration date on each prescription was instituted. To better handle the problem of filling orders for excessive quantities and depleting our inventory, a partial quantity is dispensed immediately and the remainder at a later date if needed. For example, the physician may write a prescription for a year's supply of a drug. This amount would frequently seriously deplete or exhaust the current stock. A 2 or 3 months supply may then be dispensed and a receipt given to the patient to present when he needs an additional supply of medication.

These extreme variations in drug prescriptions were matched by variations in workload. For example, in FY 1968 an average of about 120 extemporaneously compounded bulk intravenous prescriptions were ordinarily dispensed daily, but in a single 6-day period, the number ranged from 120 to 246. The number of outpatient prescriptions dispensed per day ranged from 80 to 233. This made proper staffing very difficult and strongly suggests that a better patient scheduling procedure should be considered.

Many man-hours were spent in the formulation of special dosage forms of non-investigational drugs, products which formerly were prepared by the Pharmaceutical Development Service. Examples of these types of products were dosage forms containing no carbohydrate for use by diabetics, formulations involving unusual amounts of electrolytes, placebo products to match a wide variety of dosage forms, and special sterile antibiotic irrigating solutions.

To provide a better cardiac resuscitation service the Pharmacy Service prepares and maintains a sealed drug package containing 39 different drugs. These packages are kept in 13 locations throughout the clinical area, with at least one package per floor. When the seal on one of these packages is broken, or when an expiration date approaches, a new sealed unit is issued from a reserve maintained in the Pharmacy. This assures a fresh, inspected supply of cardiac emergency drugs at all times, without the need for nurses to check these drugs at specified intervals.

A pharmacist made weekly rounds on two of the most active nursing units during the past year. This permitted better communication with the medical and nursing staffs and eased some problem areas in the process. In other cases, it resulted in increased workload on the Pharmacy, as physicians and nurses became more aware of the capabilities of the Pharmacy Service.

The interdependence of the several Services which comprise the Pharmacy Department is well illustrated by the following occurrence in FY 1968. The Central Sterile Supply Service has experienced considerable difficulty in obtaining and retaining trained male personnel for the preparation of sterile irrigating solutions. This has necessitated commercial procurement of a number of solutions which were formerly manufactured in the Central Sterile Supply Service. The remainder, or those which are not available commercially, are now compounded by pharmacists of the Pharmacy Service in the clean air benches of the Intravenous Additives Area. This frequently imposes an excessive burden on this area, as well as an additional output of work with no additional personnel to compensate for it.

CENTRAL STERILE SUPPLY SERVICE

A nominal increase in issues by the Central Sterile Supply Service was again noted this year. But, as in past years, principal problem areas were those of space and personnel.

Increased workload was again evidenced in the Tray Assembly Area, to the extent of about 10%. This nominal increase does not truly reflect the whole problem. However, when one considers that many of our trays contain multiple-part needles, each of which must be handled at least four times in the reprocessing, inspection, and packaging procedures, the total work output must be multiplied several fold in order to allow this increased use.

The same is true of supplies for the Life Island project. Because of double wrapping and certain other unusual problems, the 31,000 units of issue involved in this area do not realistically indicate the effort that is required to service these specialized patient care areas.

The fine performance of Central Sterile Supply Service personnel, involved in issuing and maintaining the wide variety of equipment for loan to the various nursing units, has greatly benefitted patient care services. The ability of the personnel to diagnose accurately the cause of mechanical problems in this equipment and to make many of the necessary repairs within the Central Sterile Supply Service area has also led to monetary savings in the Clinical Center.

Problems of stock control and inventory were monitored closely during this year. Periods of time during which supplies were not available were minimized, although procurement problems at times were serious. These are multiplied, when strict adherence to Federal procurement policies are followed, by the inadequate storage space allocated to working inventories. Additional personnel in the stock control and storekeeping areas are desperately needed to avoid many of these problems.

Although a personnel turnover of only 8.3% was noted during this year, three vacancies did occur and remained unfilled for long periods of time. Recruitment to fill vacancies remains one of the most serious personnel problems encountered by this Service. Personnel specialists have little hope of improving this situation as long as the entering grades for employees remain at the present level.

There have been numerous achievements during this year. The efficiency of the Central Sterile Supply Service improved to the point that very little overtime was required to handle the increased workload. Stock control procedures were streamlined to reduce the incidence of supply shortages. In addition, structural changes within the area resulted in a relocation of the office and stock control areas, leading to a smoother, more efficient operation. The need for salesmen and visitors to walk through the working areas of the Central Supply, thus disrupting the work of our employees, was eliminated by this relocation.

Other achievements include a more efficient storage system for intravenous and irrigating solutions. A system of mobile carts was employed, thus facilitating the neat and orderly storage of these items. This system also reduces the number of times these items must be handled from their receipt to their storage in the issue area. Continued study of receiving, processing, and issuing procedures of this Service will be made to effect further increases in operating efficiency and the quality of supplies used in the patient care areas.

OFFICE OF THE CHIEF

The Office of the Chief has continued to provide a series of lectures to new professional employees of the Nursing Department in such topics as analgesics, steroids, metric system, intravenous administration of drugs, antibiotics, and dosage forms of drugs.

In addition, upon receiving notification from the Associate Director, CC, of the possible occurrence of an adverse drug reaction, a professional staff member of the Office of the Chief examined the chart of the patient in whom the reaction was reported and furnished information for the completion of Form FD-1639, Drug Experience Report.

Finally, considerable attention was devoted during this year to the streamlining of procurement functions delegated to the Pharmacy Department and stock control procedures within all areas of the Department.

PROFESSIONAL ACTIVITIES

Milton W. Skolaut

Contributing Editor, American Journal of Hospital Pharmacy
Recipient of Andrew Craigie Award of The Association of Military Surgeons of the United States, Washington, D. C., November, 1967
Treasurer of the American Society of Hospital Pharmacists
Chairman, Accreditation Committee, American Society of Hospital Pharmacists

William H. Briner

Trustee, The Society of Nuclear Medicine
Consultant to the U. S. Food and Drug Administration
Member, Advisory Panel, Pharmacopeia of the United States
Member, Advisory Panel, National Formulary
Chairman, Committee on Radiopharmaceuticals, American Society of Hospital Pharmacists
Invited participant and work session moderator, Symposium on the Reduction of Radiation Exposure in Nuclear Medicine, Michigan State University, East Lansing, Michigan, August, 1967
Guest Lecturer, Eighth Annual Meeting of the Southeastern Society of Nuclear Medicine, Lexington, Kentucky, October, 1967
Guest Lecturer and Faculty Member, Post Graduate Symposium in Nuclear Medicine, Washington University School of Medicine, St. Louis, Missouri, January, 1968
Faculty Member, NIH Radioisotope Techniques Course
Faculty Member, Course in Nuclear Medicine for Physicians, U. S. Nacy Medical School, National Naval Medical Center, Bethesda, Maryland, May, 1968
Lecturer, Teaching Session, Annual Scientific Meeting of The Society of Nuclear Medicine, St. Louis, Missouri, June, 1968
Contributing Editor, Drug Intelligence
Presented Seminar on Radiopharmaceutical Quality Control to the Bureau of Medicine, United States Food and Drug Administration, Arlington, Virginia, February, 1968

Thomas H. Hodges

Attended Professional Seminar on Central Service Department, American Sterilizer Co., Erie, Pennsylvania, October, 1967
Attended Pharmacy Section Meeting, Association of Military Surgeons of the United States, Washington, D. C., November, 1967
Attended Federal Services Pharmaceutical Seminar, Washington, D. C., December, 1967

Joseph F. Gallelli, Ph.D.

Chairman, Membership Committee, D. C. Society of Hospital Pharmacists
Member, Chemotherapy Contract Review Committee, NCI

Vice-Chairman, Committee on Research, American Society of Hospital Pharmacists

Recipient of American Pharmaceutical Association Military Section Literary Award, Miami Beach, Florida, May, 1968

Leonard C. Sisk

Member, Committee on Publications, American Society of Hospital Pharmacists

Staff Member, DHEW National Conference on Medical Costs

Faculty Member, Post Graduate Seminar on Parenteral Incompatibilities, University of Connecticut, Storrs, Connecticut, November, 1967

Member, Panel on the Five Year Impact of New Drug Legislation on Hospital Pharmacy, Drug Information Association, December, 1967

Attended Midyear Clinical Meeting, American Society of Hospital Pharmacists, Washington, D. C., December, 1967

Richard J. Brodeur

Attended Midyear Clinical Meeting, American Society of Hospital Pharmacists, Washington, D. C., December, 1967

Robert P. Chandler
Joseph D. Cockrell, Jr.
Mary L. Pengelly

Attended Federal Services Pharmaceutical Seminar, Washington, D. C., December, 1967

Raymond J. Farkas
William H. Peterson, Jr.
Nickie H. Proctor

Attended Pharmacy Section Meeting, Association of Military Surgeons of the United States, Washington, D. C., November, 1967

PUBLICATIONS

Briner, W. H., Ashburn, W. L., Di Chiro, G., and Harbert, J.: ^{99m}Tc-Albumin for brain scanning. Drug Intelligence 1:314-316, Oct., 1967.

Briner, W. H., and Numerof, P.: Reduction of Radiation Exposure in Nuclear Medicine. In Williams, K. D., Cooper, J. F., Moore, R. T., and Hilberg, A. W. (Eds.): Proceedings of a Symposium on the Reduction of Radiation Exposure in Nuclear Medicine, Work Group II Report, pp. 117-121, U. S. Depart. of Health, Education, and Welfare, Public Health Service Publ. No. 999-RH-30, Washington, D. C., U. S. Government Printing Office, 1967, 153 pp.

Briner, W. H.: Radiopharmacy -- the emerging young specialty. Drug Intelligence 2:8-13, Jan. 1968.

Briner, W. H., Ashburn, W. L., Harbert, J., and Di Chiro, G.: Cerebrospinal fluid rhinorrhea studies with the gamma scintillation camera. J. Nucl. Med. 1968. In press.

Briner, W. H., Di Chiro, G., Ommaya, A., and Ashburn, W. L.: Isotope cisternography in the diagnosis and follow-up of cerebrospinal fluid rhinorrhea. J. Neurosurg. 1968. In press.

Briner, W. H., Di Chiro, G., and Ashburn, W. L.: High specific activity ^{99m}Tc-Albumin as a tracer for subarachnoidal and ventricular scintiphotography. An. Neurol. 1968. In press.

Briner, W. H.: The preparation of ^{125}I-labeled microaggregated human serum albumin for use in studies of reticuloendothelial function in man. J. Nucl. Med. 1968. In press.

Brodeur, R. J., and Lamy, P. P.: Interdepartmental pharmacy service in hospitals. Amer. J. Hosp. Pharm. 24:611-616, Nov. 1967.

Gallelli, J. F.: Stability studies of drugs used in intravenous solutions, Part I. Amer. J. Hosp. Pharm. 24:425-433, Aug. 1967.

Gallelli, J. F., and Peterson, W. H., Jr.: A look at the intravenous additive service at the Clinical Center, National Institutes of Health. Hospitals, 1968. In press.

Gallelli, J. F., and Skolaut, M. W.: Environment for sterile dosage formulation and control. Drug Intelligence 1:311-313, Oct. 1967.

Gallelli, J. F., and Skolaut, M. W.: Pharmaceutical development: new concept in pharmacy service. Hospitals 41:95-101, Dec. 1967.

Gallelli, J. F., Snowden, J. L., and Skolaut, M. W.: Role of the hospital pharmacist in the operation of a life island. Amer. J. Hosp. Pharm., 1968. In press.

Gressel, P. D., and Gallelli, J. F.: Quantitative analysis and alkaline stability studies of allopurinol. J. Pharm. Sci. 57:335-338, Feb.1968.

Hodges, T. H., and Allen, S. I.: An intravenous additive drug information system. Hospitals, 1968. In press.

Sisk, L. C.: Opportunities for pharmacists in radiopharmaceuticals. Amer. Prof. Pharm., 1968. In press.

Table 1

Pharmacy Department Statistical Data

	1964 (Fiscal)	1965 (Fiscal)	1966 (Fiscal)	1967 (Fiscal)	1968 (Fiscal)
Total number of units issued	4,528,914	4,849,272	unavailable	5,487,043	unavailable
Pharmacy Service					
Prescriptions	31,700	33,232	35,766	36,734	38,400
I.V. Additives (Bottles)		32,220	38,613	41,164	43,899
Drug vials reconstituted by I.V. Additive Service		42,276	36,875	42,662	40,924
Other items	301,994	266,671	305,683	248,922	255,936
Prepackaged items	53,199	62,825	57,115	56,684	50,040
Total	386,893	437,224	474,052	426,166	429,199
Central Sterile Supply Service					
Units issued	4,100,580	4,358,298	unavailable	4,500,000	4,700,000
Pharmaceutical Development Service					
Units developed and issued	37,536	48,423	52,763	51,740	unavailable
Requests processed	2,148	1,715	1,639	1,403	1,318
Investigational drugs registered	722	595	645	410	403
New investigational drugs processed		101	134	93	126
Radiopharmaceutical Service					
Work units	3,905	5,327	8,630	8,934	10,735
Requests processed	1,130	1,583	2,372	2,227	2,263
Pharmacy Officer of the Day					
Number of requests for service	1,867	2,796	3,927	4,624	4,548

Table 1 continued

	1964 (Fiscal)	1965 (Fiscal)	1966 (Fiscal)	1967 (Fiscal)	1968 (Fiscal)
Mail-out Prescriptions					
Number of prescriptions mailed		725	738	668	756

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

REHABILITATION DEPARTMENT

CC-39
Serial No.

TABLE OF CONTENTS

Introduction Rh-1
Services Provided by the Rehabilitation Department Rh-1
Physical Therapy Service Rh-1
Occupational Therapy Service Rh-2
Speech Therapy Service Rh-2
Office of the Chief Rh-3
Program Development and Changes Rh-3
Staff Training Rh-4
Participation of Personnel in Professional Activities
  Off the Campus Rh-5
Staffing and Personnel Changes Rh-6
Space Rh-7
Publications Rh-7
Tables:
1. Physical Therapy Service: Statistical Report, by Month, FY 1968 . Rh-8
2. Physical Therapy Service: Number of Different Patients Treated by Months and Institutes, July 1967 Through June 1968 . . . . Rh-9
3. Physical Therapy Service: Number of New Patient Admissions, By Institute; Comparative Statistics, FY 1964-68 . . . . Rh-10
4. Physical Therapy Service: Comparative Statistics, FY 1964-68 . Rh-11
5. Physical Therapy Service: Percentage of Inpatients Treated (Average), Exclusive of NIMH and NIDR, Comparative Statistics, FY 1964-68 . . . . Rh-12
6. Physical Therapy Service: Consultation Visits, FY 1968 . . Rh-13
7. Physical Therapy Service: Number of Patient Evaluations by the Physiatrists, FY 1964-68 . . . . Rh-14
8. Occupational Therapy Service: Number of Different Patients Treated by Months and Institutes, Including Outpatients and SACP, FY 1968 . . . . Rh-15
9. Occupational Therapy Service: Patients Admitted to Occupational Therapy Including Outpatients and SACP, FY 1968 . . . . Rh-16
10. Occupational Therapy Service: Summary Reports by Institutes of Number of Patients Treated, Number of Treatments and Hours, FY 1968 . . . . Rh-17
11. Occupational Therapy Service: Patient Treatments and Treatment Hours by Institutes: Comparative Statistics, FY 1964-68. . . . . Rh-18
2. Occupational Therapy Service: Percentage of Inpatients Treated, FY 1968 . . . . Rh-19
.3. Occupational Therapy Service: Percentage of Inpatients Treated: Comparative Statistics, FY 1964-68 . . . . . . Rh-20

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

REHABILITATION DEPARTMENT

CC-39
Serial No.

INTRODUCTION

During the period July 1, 1967, through June 30, 1968, as in previous years, the Rehabilitation Department performed its basic function of patient treatment, using recognized, effective measures of physical, occupational, and speech therapy. Again, a large number and wide variety of tests and measurements were carried out for Institute physicians primarily for evaluation of functional ability and progress, but also in connection with diagnosis and determination of effectiveness of drug and other therapy.

SERVICES PROVIDED BY THE REHABILITATION DEPARTMENT

Physical Therapy Service

1. Tests and measurements:
   - Manual muscle evaluation
   - Quantitative muscle testing
   - Joint range of motion measurements
   - Electrodiagnostic testing, including chronaxie measurements and strength-duration curves
   - Self-care evaluation (activities of daily living)
   - Vital capacity determinations (Collins Vitalometer)
   - Progressive resistance exercise evaluation
   - Pulmonary function studies (Collins Respirometer)
   - Girth, length, and volumetric measurements
2. Heat, including.
   - Superficial--hot packs, infrared, paraffin bath, whirlpool
   - Deep--shortwave diathermy, microwave, ultrasound
   - General body heat--Hubbard tank, Moistaire cabinet
3. Therapeutic exercise:
   - General exercise--passive, active assistive, active, and resistive
   - Muscle re-education
   - Ambulation training
   - Pre- and postoperative thoracic surgery program
   - Pre-prosthetic, and prosthetic training
   - Training in self-care activities.
4. Miscellaneous:
   - General and local application of ultraviolet light
   - Cervical traction
   - Pelvic traction
   - Application of splints and casts to maintain joint in good anatomical and functional position

Instruction to patients and family in home care program (application of heat, exercise, use of self-care aids)
Fitting and dispensing canes and crutches
Prescription and procurement of correct shoes, braces, corsets, splints, and prosthesis

Occupational Therapy Service

1. Physical and functional restoration:
   Maintain or regain joint range of motion
   Increase muscle strength
   Improve coordination
   Develop work tolerance
   Train in activities of daily living
   Train in development of substitute skills (visual loss)
   Make splints and provide self-care aids
2. Testing and evaluation:
   Activities of daily living, including self-care and homemaking evaluation
   Record patient's behavior patterns for use in evaluation of patient's reaction in specific research studies
   Pre- and postoperative performance tests of stereotaxic patients
3. Psychological adjustment:
   Substitute constructive interests for the insecurity and anxiety which may develop during research studies
   Provide normal developmental learning experiences for children
   Promote relaxation and acceptance of bed rest
4. Psychiatric adjustment:
   Provide activities in relation to needs of research studies and report observations of patient's behavior
   Aid patient in making acceptable social adjustment
   Aid patient in preparing for community living and carrying home responsibilities
   Place patient in industrial therapy program as a step toward post-hospital employment
5. Prevocational exploration:
   Explore skills, interests and work habits
   Increase work tolerance
   Maintain special skills required by patient's job
   Make recommendations on patient's performance and aptitudes for use in vocational planning

Speech Therapy Service

1. Speech production:
   Dysarthria, dysphonia, speech disorders related to neuromuscular disease, post-laryngectomy, functional articulation problems
2. Language:
   Delayed speech, aphasia (including related reading and writing disabilities)
3. Speech reception:
   Hearing loss

Office of the Chief

1. Evaluation of Institute patients, referred for physical medicine and rehabilitation; prescription and supervision of therapy.
2. Electromyography, including conduction velocity, and repetitive stimulation studies.

PROGRAM DEVELOPMENT AND CHANGES

Continuing programs

1. Use and evaluation of casts and splints in the treatment of patients having joint pain, contractures or deformities. The use of plaster for this purpose is well established and has been frequently described in the literature, by us (Modern Medicine 29:83-91, Oct. 2, 1961), as well as others. Plastics are relative newcomers in this field. Our experience with synthetic balata is summarized in a recent publication (Journal of the American Physical Therapy Association 47:1123-1125, Dec. 1967). This material has proved very satisfactory and is now available commercially.
2. Long-range follow-up evaluation of NINDB patients who had stereotaxic operative procedures.
3. Evaluation and treatment of patients having cystic fibrosis, including pulmonary function tests, postural drainage, breathing and posture exercises, and instruction to parents in a home treatment program. A color film with sound on the technique of postural drainage is in production, representing the cooperative effort of the Rehabilitation Department and Medical Arts and Photography Branch.
4. Pulmonary function tests in patients with acromegaly, scleroderma or hyposmia.
5. Pre- and postoperative evaluation and treatment of patients with rheumatoid arthritis who have knee synovectomy.
6. The Occupational Therapy Service continued to provide a supportive program for all patients who have been treated in the "Life Island."
7. The Occupational Therapy Service has also continued its special programs for NCI patients. The programs for children and adults who receive drug or radiation therapy as outpatients or in the Special Ambulatory Care Program have increased.
8. Speech Therapy Services consisted primarily of speech, language and hearing evaluations; short-term therapy for inpatients; parent counselling; and making referrals to speech clinics in the patients' hometowns.
9. Electromyography, measurement of nerve conduction velocity and repetitive nerve stimulation continued as services of the Rehabilitation Department. From July 1, 1967, through June 30, 1968 (April, May, and June of 1968 are estimated), we saw 252 patients for the electromyographic study of a total of 1,010 muscles; 263 patients for measurement of conduction velocity of 771 nerves; and 41 patients for stimulation studies. As expected, the majority of consultation requests were received from NINDB (189). All other Institutes sent a total of 77 consultation requests (24 from NIAMD; 27 from NHI; 17 from NCI; 8 from NIAID: and 1 from NIMH).

New Programs

1. Initiation of program carried out in collaboration with NINDB (Surgical Neurology Branch) which has been studying patients with spinal arteriovenous malformations. Pre- and postoperative evaluations by the Physical Therapy Service include manual muscle testing, quantitative muscle testing, and evaluation of functional abilities. Treatment postoperatively includes muscle re-education,strengthening exercises, gait training, and transfer activities. Twenty patients have been evaluated and treated to date.
2. Quantitative muscle testing of patients with amyotrophic lateral sclerosis. This is a resumption of previous program carried out in collaboration with NINDB (Medical Neurology Branch) which has been studying drug therapy of this disease.
3. Pre- and postoperative evaluations by the Physical Therapy and the Occupational Therapy Services of patients who have stereotaxic procedures. This is a resumption of previous program carried out in collaboration with NINDB (Surgical Neurology Branch) which has been studying Parkinsonism and dystonia.
4. The Occupational Therapy Service has developed a special program for NIAMD patients with Lesch-Nyhan syndrome. These patients with compulsion for self-mutilation need restraints to keep them from biting their hands. A new type of splint was developed which prevents them from getting their hands to their mouths but allows freedom to use the hands in various activities appropriate to their capacities and needs.

STAFF TRAINING

For Rehabilitation Department Personnel

1. Dr. Vadim Pavlov, Russian orthopedic surgeon attached to the Rheumatology Institute of Moscow, spent 1 1/2 days in July 1967 in the Rehabilitation Department. He described to us his surgical approaches in the treatment of rheumatoid arthritis patients. In exchange, we demonstrated to him our splinting technics using plaster, or plastic materials. He was given samples of hand and wrist splints to take home with him.
2. In September 1967 Mrs. Mary Duncan, staff physical therapist, conducted a series of lectures based on the 2-weeks' course she took at Western Reserve University, Cleveland, Ohio, in June 1967. The course was titled "Newer Concepts in the Treatment of Hemiplegia." Mrs. Duncan's presentations (for all Rehabilitation Department personnel), covered basic aspects of developmental and neurophysical approach to effective treatment in neuromuscular conditions, as well as demonstration and practice of specific neuromuscular facilitation technics.
3. Attendance at conferences, lectures, and miscellaneous medical ward rounds conducted by clinical investigators of the categorical Institutes.
4. Periodic staff meeting and orientation sessions for the Occupational Therapy and Physical Therapy staffs. These have included presentations and discussions of medical conditions of patients treated by the Rehabilitation Department, research programs, developments in the field of occupational and physical therapy, and reports on institutes and conferences attended.

5. Attendance by Occupational Therapy and Physical Therapy staff members at medical ward rounds, conferences and lectures conducted by the Clinical Center medical staff.

By Rehabilitation Department Personnel

1. Lectures on and demonstrations of Physical Therapy and Occupational Therapy for the chronically ill patient, given twice to employees in the Advanced Course for Practical Nurses.
2. Two education sessions for Nursing Service Assistants by Mr. Mario Salvanelli, Assistant Chief, Physical Therapy Service, on patient bed positioning and transfer activities, and posture and body mechanics in the nursing arts.
3. Demonstration and instruction by Mrs. Carol Wood, physical therapist, on postural drainage technics, to Nursing unit staffs on NIAMD and NINDB.
4. Orientation to Physical Therapy and Occupational Therapy of new Social Work Department staff members, new American Red Cross Hospital Volunteers, Junior Red Cross Hospital Volunteers, interns of Spiritual Ministry Department, Patient Activity staff, and many professional visitors from this country and abroad.
5. Monthly tour of new Nursing personnel through the Physical Therapy and Occupational Therapy Services, with orientation regarding the function and scope of the Rehabilitation Department.

PARTICIPATION OF PERSONNEL IN PROFESSIONAL ACTIVITIES OFF THE CAMPUS

1. Dr. David M. Fried, Chief, Rehabilitation Department, Mr. Lamont Smith and Mr. Neil Hartman (physical therapists) and Miss Ruth Singleterry and Mrs. Louise Bezdek (occupational therapists) attended afternoon and evening sessions on "Treatment of the Hemiplegic" given at D. C. General Hospital, February 29, 1968. The seminar was conducted by Dr. Mieczyslaw Peszczynski, Professor of Physical Medicine and Rehabilitation, Emory University Medical School.
2. Miss Vida Jo Niebuhr, Chief, Physical Therapy Service, participated in monthly meetings of the PHS Therapist Commissioned Officer Board, and as NIH representative in periodic meetings of the PHS Therapist Career Development Committee.
3. Miss Mary Beach, Chief, Occupational Therapy Service, attended the Annual Conference of the American Occupational Therapy Association in Boston, Massachusetts, October 18-21, 1967, at her own expense because of a temporary "freeze" on funds for such purposes. She also participated at this Conference in the meeting of the Council on Finance of the American Occupational Therapy Association, of which she was a member.
4. Miss Mary Clare Nuss, occupational therapist, attended and participated in the American Occupational Therapy Association Regional Workshop on "Man as an Object in an Object World," July 9-14, 1967, at Boiling Springs, Pennsylvania.
5. Mrs. Carole Day, Miss Susanlee Nelson (occupational therapists)and Miss Beach attended the workshop on the use of the new plastics in making hand and wrist splints given by the D.C. Occupational Therapy Association on March 16, 1968.
6. Miss Austina Mallory, occupational therapist, attended the American Occupational Therapy Association Regional Institute on the evaluation process as related to the treatment of the psychiatric patient, held at St. Elizabeths Hospital, Washington, D.C., May 5-10, 1968.

STAFFING AND PERSONNEL CHANGES

Office of the Chief

1. Appointments: none
2. Resignations: none
3. Current Staffing Pattern:

Chief, Rehabilitation Department	1
Assistant Chief, Rehabilitation Department	1
Speech Therapist	1
Secretary	1
	4

Physical Therapy Service

1. Appointments:
   Mrs. Eva Massar, GS-5, February 1968, secretary
2. Resignations:
   Mrs. Ruth Love, May 9, 1968, following maternity leave, February 1968
   Mrs. Carol Wood, CO Therapist, June 1968, due to marriage
3. Transfers:
   Mr. Neil Hartman, CO Therapist, March 1968, to PHSH, San Francisco,Calif.
4. Replacements anticipated:
   In July 1968, of Mr. Hartman
   In September 1968, of Mrs. Wood
5. Current Staffing Pattern:

Chief, Physical Therapy Service	1
Assistant Chief, Physical Therapy Service	1
Supervisory Physical Therapist	1
Staff Physical Therapists	5
Physical Therapy Assistants	2
Secretary	1
	11

Occupational Therapy Service

1. Appointments:
   Miss Susanlee Nelson, GS-6, July 1967, occupational therapist
   Mrs. Judith Schreiber, GS-8, November 1967, occupational therapist
2. Separations:
   Mrs. Ruth Murphy, GS-8, October 1967, occupational therapist
3. Current Staffing Pattern:

Chief, Occupational Therapy Service	1
Assistant Chief, Occupational Therapy Service	1
Staff Occupational Therapists	8
Occupational Therapy Assistant	1
Secretary	1
	12

SPACE

Temporary relocation of the Physical Therapy Service in the Clinical Center 14th floor gymnasium was mentioned in last year's report. Scheduled renovation of our regular area on the 5th floor (D-wing) is approaching completion, and we anticipate return to this area in mid-summer.

PUBLICATIONS

Fried, D. M., Larson, L. M., and Salvanelli, M.L.: Splinting with a new thermoplastic material. J. Amer. Phys. Ther. Ass. 47:1123-1125, Dec. 1967.

PHYSICAL THERAPY SERVICE

Table 1: Statistical Report, by Month
Fiscal Year 1968 *

	No. of working days	No. of different patients treated		No. of patient visits		No. of treatments given	
		IP	OP	IP	OP	IP	OP
July 1967	20	98	29	795	91	1310	248
Aug "	23	99	33	896	115	1718	273
Sept "	20	110	26	723	57	1352	139
Oct "	22	109	32	791	74	1683	165
Nov "	20	113	32	779	97	1475	217
Dec "	20	97	24	647	83	1431	179
Jan 1968	22	90	36	790	80	1318	172
Feb "	20	119	35	733	103	1241	273
Mar "	21	118	34	774	88	1276	211
Apr "	22	120	26	725	86	1321	241
May "	22	113	37	815	100	1445	265
June "	20	105	33	830	106	1270	250
Total	252	1291	377	9298	1080	16840	2633
		1668		10378		19473	

* Estimates for April, May, and June

PHYSICAL THERAPY SERVICE

Table 2 : Number of Different Patients Treated,
by Months and Institutes,
July 1967 through June 1968*

Month	NHI	NIAMD	NCI	NIAID	NINDB	NIMH	NIDR	Total
July 1967	20	27	33	10	37	-	-	127
Aug "	20	35	34	8	34	1	-	132
Sept "	20	29	43	6	37	1	-	136
Oct "	21	30	37	4	46	2	1	141
Nov "	16	28	47	4	47	2	1	145
Dec "	16	22	33	4	45	-	1	121
Jan 1968	18	27	35	4	42	-	-	126
Feb "	24	41	41	7	41	-	-	154
Mar "	17	34	43	13	44	1	-	152
Apr "	18	40	35	5	47	1	-	146
May "	18	42	37	7	46	-	-	150
June "	21	35	25	11	46	-	-	138
Total	229	390	443	83	512	8	3	1668

* Statistics for April, May, and June are estimates

PHYSICAL THERAPY SERVICE

Table 3: Number of New Patient Admissions, by Institute;* Comparative Statistics, Fiscal Years 1964-68

Fiscal Year	NHI	NIAMD	NCI	NIAID	NINDB	NICHD	NIMH	NIDR	Total
1964	263	352	121	39	304	-	11	2	1092
1965	275	280	314	47	355	-	5	-	1276
1966	226	300	179	38	497	2	3	-	1245
1967	152	307	225	33	410	-	3	-	1130
1968	140	274	264	46	328	-	4	1	1057
Total	1056	1513	1103	203	1894	2	26	3	5800

* Statistics for April, May, and June are estimates

PHYSICAL THERAPY SERVICE

Table 4: Comparative Statistics,
Fiscal Years 1964-68*

Fiscal Year	No. of different patients treated	No. of Patient visits**	No. of treatments given***
1964	1780	11.743 (1894)	24,155 (470)
1965	1818	11.263 (1593)	22,857 (506)
1966	1827	10,555 (2002)	21,284 (547)
1967	1769	10,714 (2040)	20,883 (493)
1968	1668	10,378 (1704)	19,473 (442)

* Estimated statistics for April, May, and June

** Number of visit cancellations indicated in parenthesis

*** Number of 'one-time visits only' indicated in parenthesis

Table 5: Percentage of Inpatients Treated (Average),
Exclusive of NIMH and NIDR
Comparative Statistics, Fiscal Years 1964-1968*

Fiscal Year	NHI	NIAMD	NCI	NIAID	NINDB	All Five Institutes
1964	21.6	30.8	7.5	7.2	33.1	18.6
1965	20.5	27.8	6.3	8.8	35.8	18.4
1966	18.7	23.8	8.1	8.5	39.7	18.9
1967	11.7	28.8	11.1	8.7	38.6	18.3
1968	7.7	27.8	13.0	11.6	32.1	16.8

* Statistics for April, May, and June are estimated.

PHYSICAL THERAPY SERVICE

Table 6: Consultant Visits,
Fiscal Year 1968*

Rehabilitation Department Consultant: No visits

Orthotist: 33 visits for 67 patient examinations

Shoe fitter: 16 visits for 45 patient examinations

* Estimates for April, May, and June

PHYSICAL THERAPY SERVICE

Table 7: Number of Patient Evaluations by the Physiatrists
Fiscal Years 1964-1968 *

Fiscal Year	NHI	NIAMD	NCI	NIAID	NICHD	NIMH	NIDR	Total
1964	63	319	141	27	-	14	1	939
1965	67	230	150	33	-	4	-	917
1966	88	176	133	38	1	2	-	894
1967	101	219	187	32	-	2	-	1031
1968	110	187	199	39	-	3	-	888

* Based on estimates for April, May, and June

OCCUPATIONAL THERAPY SERVICE

Table 8: Fiscal Year 1968

Number of Different Patients Treated by Months * and Institutes, Including Outpatients and SACP

	NCI			NHI		NIAID	NIAMD		NIDR	NIMH		NINDB		TOTALS		
	IP	OP	SACP	IP	OP	IP	IP	OP	IP	IP	OP	IP	OP	IP	OP	SACP
July 1967	106	6	15	124	1	19	63		5	48	4	57	5	422	16	15
August	108	7	12	130	1	24	74		5	49	4	65	3	455	15	12
September	91	7	15	121	1	22	63		3	43	6	65	4	408	18	15
October	90	6	16	110	1	27	51		5	46	3	73	4	402	14	16
November	107	6	12	110	1	27	51	1	3	50	5	76	3	424	15	12
December	101	5	15	103		26	46		3	54	3	70	2	403	11	15
Jan. 1968	90	6	30	116		29	44		1	48	6	69	1	397	13	30
February	104	9	22	125		31	61		5	48	7	58	1	432	17	22
March	109	13	24	134		34	71		5	48	5	63	1	464	19	24
April	110	7	20	121		25	58		3	45	5	68	2	430	14	20
May	105	8	18	123		27	55		4	48	4	65	3	427	15	18
June	102	9	21	120		26	60		5	50	3	69	3	432	15	21
Totals	1223	89	220	1437	5	317	712	1	47	577	55	798	32	5111	182	220

* Estimates for April-June 1968

OCCUPATIONAL THERAPY SERVICE

Table 9: Fiscal Year 1968
Patients Admitted to Occupational Therapy
Including Outpatients and SACP*

	NCI			NIH	NIAID	NIAMD		NIDR	NIMH		NINDB		TOTALS		
	IP	OP	SACP	IP	IP	IP	OP	IP	IP	OP	IP	OP	IP	OP	SACP
July 1967	33	1	5	64	4	30		2	15		26	4	174	5	5
August	48	1	6	75	9	35		1	6	1	30	2	204	4	6
September	37	1	8	56	8	24		2	6	3	27	3	160	7	8
October	47		11	51	9	18		2	13		36	2	176	2	11
November	50	2	4	48	9	24			11	2	35	1	177	5	4
December	41		10	36	6	13	1	2	10		22	1	130	2	10
Jan. 1968	49	2	23	80	17	33		1	15	4	37		232	6	23
February	55	3	11	57	9	24		5	14	2	22		186	5	11
March	50	5	16	66	14	40		0	9	1	29	1	208	7	16
April	58	3	12	55	8	25		3	12	2	30	2	191	7	12
May	50	4	13	52	9	28		2	14	1	25	3	180	8	13
June	55	3	10	55	8	24		3	15	2	22	2	182	7	10
Totals	573	25	129	695	110	318	1	23	140	18	341	21	2200	65	129

* Estimates for April - June 1968

OCCUPATIONAL THERAPY SERVICE

Table 10: Fiscal Year 1968
Summary Report by Institutes of Number
of Patients Treated, Number of Treatment and Hours*

Institutes	Number of different patients treated			Number of patients treatments			Number of treatment hours		
	IP	OP	SACP	IP	OP	SACP	IP	OP	SACP
NCI	1223	89	220	5160	166	525	3464	190	497
NHI	1437	5		5770	14		4053	9	
NIAID	317			1848			1152		
NIAMD	712	1		3096	1		2115		
NIDR	47			157			151		
NIMH	577	55		10,806	155		12,460	137	
NINDB	798	32		4145	72		4264	44	
Totals	5111	182	220	30,982	408	525	27,659	381	497

* Estimates for April - June 1968

OCCUPATIONAL THERAPY SERVICE

Table 11: Comparative Statistics
Fiscal Years 1964 - 68
Patient Treatments and Treatment Hours by Institutes*

Fiscal years	Number of dirrerent patients treated			Number of patients treatment			Number of treatment hours		
	IP	OP	SACP	IP	OP	SACP	IP	OP	SACP
1964	4,822	8		29,665	91		28,154	122	
1965	4,886	25		26,628	114		25,910	114	
1966	4,988	152	131	30,321	265	382	26,550	303	369
1967	5,241	115	187	31,620	216	499	27,900	203	471
1968	5,111	182	220	30,982	408	525	27,659	381	497

* Estimates for April - June 1968

OCCUPATIONAL THERAPY SERVICE

Table 12: Fiscal Year 1968
Percentage of Inpatients Treated*

	NCI	NHI	NIAID	NIAMD	NIDR	NIMH	NINDB	TOTALS
July 1967	49.1	63.6	36.7	70.8	100	87.2	57.6	59.3
August	47.5	74.7	55.8	78.7	100	86	62.5	64.6
September	40.6	72	44	86.3	100	91.4	65.6	61.4
October	40.7	70.5	41.5	71.8	100	96	70.9	60.3
November	45.3	64	39.7	70.8	100	98	72.4	60.1
December	48.1	71.5	43.3	79.3	100	93.1	74.4	64.3
Jan. 1968	44.1	68.7	59	67.6	50	87.3	68.3	61.5
February	50	72.2	54.4	66.3	62	78.7	61.1	62.2
March	51.1	78.4	53.1	75.5	100	78.6	62.3	65.4
April	54.1	73.2	51.2	74.5	100	85.8	68.4	60.9
May	52.4	74.1	49.2	78.2	60	80.3	70.2	63.2
June	53	72.3	45.6	79.8	75	84.2	65.4	64.3
Monthly averages	48	71.2	47.8	75	87.3	87.2	66.6	62.3

* Estimates for April - June 1968

OCCUPATIONAL THERAPY SERVICE

Table 13: Comparative Statistics Fiscal Years 1964 - 68
Percentage of Inpatients Treated

Fiscal year	NCI	NHI	NIAID	NIAMD	NICHD	NIDR	NIMH	NINDB	TOTALS
1964	58.7	57.8	25	78.6		22.6	69	62.1	58
1964	55.7	57.7	26.5	83.1		66.1	69.9	58.6	59.9
1966	55.8	60.3	23.5	74.2	73.7**	46.6	71.3	65.2	58.4
1967	54	71.7	45.3	79.9	100 ***	61.1	72	55.2	63.1
1968*	48	71.2	47.8	75		87.3	87.2	66.6	62.3

* Estimated figures April - June 1968
** In FY 1966 NICHD Jan- June Only
*** In FY 1967 NICHD July Only

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

SOCIAL WORK DEPARTMENT

CC-21
Serial No.

TABLE OF CONTENTS

Major Trends SW-1

Social Work Services Rendered SW-2

Patient Welfare Fund SW-3

Staffing SW-5

Staff Development SW-6

Practice Oriented Studies SW-8

Problem Areas SW-8

Future Objectives SW-10

Reports from Department Sections

- Neurological Social Work Section SW-11
- Arthritis and Metabolic Diseases - Allergy and Infectious Diseases Social Work Section . . SW-14
- Cancer Social Work Section SW-18
- Heart Social Work Section SW-20

Individual Project Reports

- The Peer Group Phenomenon in Young Women in Cancer SW-23
- The Effect of Cystic Fibrosis on the Social Functioning of Adolescent and Young Adult Patients . . . SW-25
- Does Surgical Success in Children with Heart Diseases in the Latency and Adolescent Age Groups Result in Significant Positive Changes in Social Functioning . . . SW-26
- Evaluation of Social Functioning of Male Patients Following Replacement of Their Aortic or Mitral Valves . SW-28

Professional Activities SW-29

Tables:

1. Inpatient Coverage by Percentage Served Each Month . . SW-33
2. Number of Clients Served Each Month SW-34
3. Major Concentration of Problems on Each Institute . . SW-35
4. Summary of Monthly Totals of Patients Served SW-36
5. Group Activity Report SW-37
6. Patient Welfare Fund Expenditures (FY 1968) SW-38
7. Patient Welfare Fund Expenditures (FY 1967) SW-39
8. Patient Welfare Fund Income SW-40

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

SOCIAL WORK DEPARTMENT

CC-21
Serial No.

MAJOR TRENDS

This fifteenth anniversary year of the Clinical Center and its Social Work Department has been marked by the department having been able to provide services to the highest number of inpatients, outpatients, and family members in its history. This high volume of coverage reflected the priority given to clinical services by an exceptionally well qualified staff which emphasized its ready availability. In a year when the department experienced considerable personnel turnover and a reduction in size by two positions due to a "ceiling freeze" instituted last fall, it has been necessary to sharply curtail the amount of staff time previously devoted to research and decrease the amount of staff involvement in community and professional activities.

Recruitment and staffing again proved to be major problems. The department experienced nine resignations from professional positions and three clerical positions. The clerical positions were filled within a month after being vacated. It was only possible to hire six satisfactorily qualified social workers for the vacated professional positions, so the department is presently operating with three less than its authorized ceiling. Present prospects appear good for recruiting for the vacancies; however, new staff will probably not be able to report until July. Despite a critical shortage of social workers and a marked decrease in those expressing a preference for work in the health field, the department has been able to maintain a standard of full professional training for all social work staff. Further, it has been possible to retain a very "seasoned" staff, having an average of approximately eleven years post Master's degree work experience in this and other settings.

During FY 1968 the overall level of operation of the Patient Welfare Fund was markedly improved. Procedures suggested by the Management Survey and Review Branch were fully implemented so that full accountability for funds was insured. The general guidelines for disbursing funds were reviewed with Clinical Center administration and members of the department staff in order to make certain that funds were being spent in accord with the purpose for which they were established. The major change instituted by this latter review was a decision to reduce, possibly even eliminate, the kind of long-term support formerly given to a few family members who remained in the area for several months or even years during a patient's hospitalization. Thus far, it has been possible to accomplish this latter goal without any seeming undue hardship, principally by increased assistance to family members in considering alternate plans. Currently, the fund has a substantial balance and prospects appear good for our continuing ability to obtain sufficient income to provide appropriate services and emergency expenses for patients and family members.

SOCIAL WORK SERVICES RENDERED

Inpatient Coverage

The department's average monthly inpatient coverage for the nine months was 73% (Table 1). A full range of social work services was provided each month for an average of 433 inpatients and 208 of their family members (Table 2, column 3). In comparison to the previous year, our percentage of coverage remained the same at 73%. The method of computing the department's coverage rate on a month-to-month basis does tend to conceal the fact that practically all patients are provided with social work services at some time during the course of their hospitalization.

Clients' Principal Problems

For each patient and family member provided with social work services, the staff member is asked to designate the major problem for which service was given (i.e. problems in hospital experience, reaction to illness and disability, problems of separation, problems of readjustment in living patterns, problems of resources or problems in family relationships - Table 3).

As in previous years, the two most common problems for patients and family members were their concerns related to the meaning of illness and disability and reactions to the hospital experience. The emergence of these problems year after year as principal areas of client concern does point up the need for social workers in a hospital setting to be well informed about the emotional implications of illness and the effect of a hospital milieu on patient's feelings.

Categories of Patients Served

Each month the department reports on the number of patients served in five principal categories: (1) Screening - exploration to determine suitability for admission to the NIH Clinical Center;

(2) Preadmission - services between acceptance for admission to a project and Clinical Center outpatient or inpatient admission; (3) Inpatient - person occupying a bed in the Clinical Center; (4) Clinic - person under outpatient treatment who has never been an inpatient; and (5) Follow-up - outpatient contact with former inpatient. To demonstrate trends in service, Table 4 summarizes the monthly totals of patients provided with social work services during the first nine months of Fiscal Years 1967 and 1968.

Comparison of the trends for Fiscal Years 1967 and 1968 is invalid as the figures for FY 1967 include the presence of the Mental Health Section for two months. Allowing for this latter distortion though, it is evident that the department has nearly doubled the number of Follow-up patients served over the previous year. This trend toward more outpatient service reflects the department's increased efforts to have a social worker present in the clinics to identify persons needing help.

Indirect Service to Clients

Table 5 presents a summary of staff time not used in providing direct service to clients but essential to the department's participation in the total treatment program. Examples of such activities are attendance at ward rounds, department committees and meetings, team conferences, nursing conferences, professional meetings, and involvement in community programs. A projection for the entire year of the figures presented in Table 5 indicates that the staff spent about 7,300 hours during FY 1968 in such related activities, or about 17% of the available staff time. This latter figure does not include the breakdown of activities for the Chief and Assistant Chief.

PATIENT WELFARE FUND

This fund continued to serve a crucial need in providing services and emergency expenses for Clinical Center patients and families which could not be paid out of appropriated government funds. The fund is financed by contributions for individual donors (e.g., former patients, family members, friends of patients, and NIH employees) and the NIH Recreation and Welfare Association. One special source of income is the annual gift from NIH employees at Christmas time under the "Davis Plan" whereby staff is encouraged to donate to the Patient Welfare Fund in lieu of sending Christmas cards to fellow employees. A record total of $2,669.55 was given this year.

In contrast to its long-standing practice of donating a percentage of vending machine profits for support of this fund, the Recreation and Welfare Association in FY 1968 committed its organization to a regular contribution of $2,000.00 per quarter or $8,000.00 per year. This fixed commitment will facilitate better planning for use of the fund as it eliminates the former unpredictability of income.

Contrary to its position one year ago when it appeared that the Patient Welfare Fund was in danger of insolvency as a result of the high rate of expenditures, the fund had achieved a "comfortable" balance of $9,351.45 by March 31, 1968 (Table 6) and prospects for maintaining stability appeared good. The total amount of money expended for the first nine months of FY 1968 was $10,325.09. Of this sum, as in previous years, the largest amount of approximately 70% was spent for the support of family members who needed to be present during some kind of crisis in the patient's illness.

The five principal areas of expenditures (Table 6) and the percentage breakdown was as follows:

Patient activities (Unit parties, supplies, etc.)	2.9%
Patient transportation	5.2%
Patient miscellaneous expenditures (Telephones, clothing, special devices)	9.8%
Basic necessities (Small weekly spending allowances for patients without funds)	12.1%
Allowance to relatives	70.0%

The major factor responsible for a reduction in expenditures from the Patient Welfare Fund this Fiscal Year compared to last (Table 7) was the marked drop in the amount paid for allowances to relatives. In FY 1967, a total of $16,959.02 was spent for this category. By contrast, $7,225.45 was spent in the first nine months of this year, making it appear that the total for FY 1968 will be approximately $10,600.00. This reduction of expenses for allowances to relatives was accomplished principally by discontinuing our former policy of maintaining a number of family members in the area over very extended periods of time. Given the continued high rate of referrals for help to families from this fund and our present limited sources of income, it will be necessary to maintain a general policy of limiting support to relatives to short-term periods not exceeding several weeks.

STAFFING

The department was authorized 30 budgeted positions (24 professionals and 6 clerical) at the beginning of the year, the same number as in the previous fiscal year. For budgetary reasons, a "ceiling freeze" was later placed on the department limiting it to the number of staff employed on October 31, 1967 - 22 social workers and 6 clerical. As a consequence of this "ceiling freeze," it appears that the department will not be able to plan the hiring of replacements for either the recently vacated group work position or the long standing clinical social worker vacancy on the Heart Section. The department's current authorized 22 professional positions were assigned as follows: Office of the Chief - 2; Cancer Section - 6; Heart Section - 6; Arthritis and Metabolic Diseases - Allergy and Infectious Diseases Section - 4; and Neurology Section - 4.

As in the previous year, the department again experienced considerable turnover in personnel at both the clerical and professional levels. We were fortunate in filling the three clerical vacancies in about one month following resignations on the Cancer, Neurology, and Arthritis and Metabolic Diseases Sections. In filling the professional positions, however, it was generally necessary to leave most positions vacant for periods of two to four months before a suitable replacement could report for duty.

Nine members of the professional staff resigned their positions in FY 1968. Mrs. Karen Tomar, Cancer Section, moved to Philadelphia with her husband in July; Mrs. Kathleen Dunn, Cancer Section, accepted a position with Children's Hospital in July; Mr. David Callagy, Allergy and Infectious Diseases Section, a Commissioned Officer, transferred to an assignment with the Office of Equal Health Opportunity in August; Miss Karen Schulman, Heart Section, moved to Australia in September; Miss Nancy Ruben, Heart Section, returned to her home in Chicago and accepted a position with the Illinois State Psychiatric Institute in October; Miss MaryLou Farley, Heart Section, returned to her home in Richmond and accepted a position with the Medical College of Virginia in December; Mr. Lawrence Burke, Cancer Section, a Commissioned Officer, transferred to an assignment as Chief Social Worker, U.S. Public Health Hospital, Baltimore, in March; and Mrs. Denise Bienfang, Cancer Section, moved to Boston with her husband in June.

pa[illegible]

who [illegible]ng FY 1968, six professional staff members were recruited. Recruitment of persons with satisfactory backgrounds for the positions open proved most difficult as there was a decided decline in the number of well qualified applicants compared to previous years. The department was most fortunate in its selection of a highly qualified and mature group of new staff members as all were able to make a relatively rapid adjustment to the complex demands of working in this setting.

Mr. Kenneth Wedel joined the department on August 5, 1967, and was assigned to the Allergy and Infectious Diseases Section. Mr. Wedel was the first Commissioned Officer to join the department since 1963. He came here from Atchison, Kansas, where he had been Director of the County Welfare Department for two years. Prior to that time he had worked for a year at the Kansas State Welfare Department's main office on a special project assignment.

Miss Carolyn Silverstein joined the department on September 18, 1967, as social group worker. She received her Master's degree from the Columbia University School of Social Work in 1965 and had worked for the past two years at the Friendship Settlement House in Washington, D. C.

Mrs. Stella Dundin joined the department on October 9, 1967, and was assigned to the Cancer Surgery Service, Cancer Section. Mrs. Dundin earned her Master's degree in Social Work at Catholic University and came to our department from a position as caseworker at Catholic Charities, Washington, D. C.

Mrs. Jane Weiner joined the department on October 16, 1967, and was assigned to the Arthritis and Metabolic Section where she has responsibility for Endocrinology, Metabolism, and Gastroenterology Services. Mrs. Weiner received her Master's degree in Social Work in June 1967 at the University of Maryland.

Mrs. Gilda Ludwig joined the department on October 30, 1967, and was assigned to the Cardiology Service, Heart Section. Mrs. Ludwig was awarded the Master's degree in Social Work at the University of Ohio School of Social Work in 1961. Her work experience included a casework and supervisory position at the Hamilton County Welfare Department from 1961-1964, and a position as school social worker at the West Clermont Schools, Amelia, Ohio, from 1964-1967.

Miss Elizabeth McClung joined the department on November 6, 1967, and was assigned to the Cardiology Branch, Heart Section. Miss McClung earned her Master's degree at the University of North Carolina in 1965, and was a member of the staff of the Children's Home Society, Roanoke, Virginia, for two years before coming to the Clinical Center.

STAFF DEVELOPMENT

The recruitment of six new staff members during the year required in the department to again make a considerable investment in supervision and consultation. All new staff members came with a background of excellent work experience and considerable maturity; therefore, they were able to assume their job responsibilities very quickly. Because none had worked in a medical setting at a post-Master's level, however, it was necessary to provide extensive orientation to the complex requirements of working in a hospital.

Research consultation was provided again this year by Dr. Geraldine L. Conner, Professor, Boston University School of Social Work, Boston, Massachusetts. Unfortunately, budget limitations prevented the department from scheduling the six two-day visits with staff which were originally planned. In the three visits (two days each) which were arranged, Dr. Conner continued to serve as leader of the department workshop "Orientation to Research" for six new staff members and furnished consultation on a number of new and old practice related studies. She has also provided consultation to the Program Review Committee which designed a small study, "sampling" selected areas of department practice during a typical month.

During the year, two staff members - Miss Mary Dean Aber, Neurology Section, and Miss Marian A. Braye, Heart Section, took the Doctoral Seminar in Social Casework at the Catholic University of America School of Social Work. Mr. Lawrence D. Burke returned to the staff after spending an academic year in the social work and sociology program at The Catholic University of America. His training was financed by Clinical Center as part of the Career Development Program offered Commissioned Officers in the Public Health Service.

One-third of the staff attended one or more out-of-town professional meetings, including the National Conference on Social Welfare, American Orthopsychiatric Association, American Association for Child Care in Hospitals, and the Johns Hopkins Hospital Conference on the Chronically Ill Child. In addition, staff visits were made to five out-of-town hospitals for orientation to specific aspects of their social work programs: Mary Immaculate of New York, University of Oklahoma Medical Center, the Memorial Hospital for Cancer and Allied Diseases, the Johns Hopkins Hospital, and Montefiore Hospital of New York.

Since May 1967, a department committee composed of the Assistant Chief and four Program Supervisors, has been conducting a staff review of social work practice. Initial goals were to (1) implement the department's professional responsibility to examine practice and to seek ways of improving practice; (2) gain knowledge of the common categories of problems and practice issues across Institute Sections; and (3) develop criteria and a method for future periodic departmental practice review. Between March and May 1968, all staff members were asked to report certain demographic and other data related to all patients known to the Social Work Department during March and those who remained in the hospital through May. This information, highlighting certain characteristics of Clinical Center patient population, will provide a framework from which to view our practice. The committee continues to work with the problem of developing a method for identifying the nature and quality of casework intervention and for classifying areas of social work concern and expertise.

PRACTICE ORIENTED STUDIES

Two articles based on research completed in the department were published by present or former staff members. "The Meaning of the Taulbee-Session Configurational Score on the Minnesota Multiphasic Personality Inventory with Neurosurgical Patients" by Herbert Lansdell, Ph.D., Head of NINDB Section on Clinical Psychology, and Mr. A. Robert Polcari of the department's Neurology Social Work Section, was published in the April 1968 Journal of Clinical Psychology. "Emotional Support for the Fatally Ill Adolescent" by Myron Karon, M.D., former Chief Pediatrician, NCI, and Mr. Joel Vernick, former Social Work Department Group Worker, was published in the May 1968 issue of Clinical Pediatrics. In addition, two other articles have been accepted for publication in the near future. "Peer Group Membership of Young Women with Cancer" by Mrs. Belvin R. Blandford, Cancer Section, has been accepted by the Journal of Chronic Diseases. "Some Problems of the Recent Social Work Graduate in the Integration of Learning" by Mrs. Myrna M. Weissman, formerly of the Arthritis and Metabolic Diseases Section, has been accepted by Medical Social Work for September 1968 publication.

As in past years, the department has continued to receive many requests from social workers and members of other professional disciplines for reprints of articles about our practice. Articles in particular demand have been those published by Mr. Joel Vernick, former department group worker, on his experiences in providing services to children with leukemia, and Mrs. Juanita Turk's paper entitled "Impact of Cystic Fibrosis on Family Functioning."

PROBLEM AREAS

1. Continued evaluation of the department's methods and responsibilities for providing coverage to both patients and family members in the Special Ambulatory Care Program (SACP) is required. Despite the efforts of the Cancer Section Social Work staff to extend services to these patients, there is an almost inevitable loss of contact due to our limitation of being able to provide services at the Clinical Center only. Unlike outpatients in the usual community hospital who are generally residents of the local area, SACP patients are not only strangers to most local community resources but are also culturally removed from the value system of the local affluent suburban area.

2. The department's continued lack of effective liaison with local schools of social work due to its inability to offer field work training for graduate students presents several handicaps: (1) certain staff members are deprived of the opportunity to assume teaching responsibilities; (2) the department loses some of the feedback about new practice developments that accrues from

a university affiliation; and (3) there is an absence of close liaison with potential applicants for staff positions.

3. Due to severe restrictions on travel funds, it will not be possible to continue to employ Dr. Geraldine L. Conner of Boston, Massachusetts, as our Research Consultant after this year. The department has been advised that it may employ a consultant from the local area but so far no suitable candidate has been found. The hiring of a suitable consultant is made particularly difficult because most researchers lack an orientation to social work and those who do have a social work background are in very short supply nationally as well as locally.

4. Recruitment is increasingly difficult because of our gradually declining ability to match salaries available in other settings. Furthermore, social workers generally are showing even less preference than formerly for work in hospitals. As an example of our competitive disadvantage in the salary area, it should be mentioned that the professional association, the National Association of Social Workers, has recently recommended a beginning salary of $10,500.00 per year for newly graduated persons with the Master's degree and no experience. The department can offer only $8,054.00.

5. The need to upgrade the level of our section secretarial positions from the present GS-4 to a GS-5 continues to present a severe problem in our potential ability to retain the services of experienced persons. So far, no action has been taken on our often repeated request that these positions be upgraded. Consequently, the department continues to serve as training ground for secretaries who move on to better positions.

6. As was reported last year, the department has continued to experience much frustration in its efforts to deliver a high quality of services to the non-English speaking patient group on the Heart Section. The situation was relieved somewhat by the hiring of a competent Greek interpreter this past year. However, the markedly increased number of Spanish speaking patients from Puerto Rico again forces the staff to spend much time in seeking out volunteer interpreters who are often not available at critical times.

7. Since October 31, 1967, the department has had a "ceiling freeze" which has prevented it from having replacements for two professional positions vacated earlier in the year. If this reduction in the size of our professional staff continues into next year, some attention must be given to how certain current staff assignments can be changed to permit the department to carry out its priorities in service delivery.

FUTURE OBJECTIVES

1. The return of the two positions for professional staff which were "frozen" effective October 31, 1967. This action reduced the previously authorized number of professional staff from a level of 24 to the current 22.

2. Continuation of the Practice Review Committee, organized this past year under the chairmanship of the Assistant Chief, as a means of examining practice problems and methods which effect the delivery of our services.

3. One additional social worker to staff the new Nursing Unit on 13-East for patients to be admitted by the Institute on Child Health and Human Development.

4. Serving as a field work placement agency for one of the local graduate schools of social work. Department staff would benefit from the stimulation provided by training responsibility and the liaison with a university.

5. Continued maintenance of a high level of coverage in providing social work services to all categories of patients and families. Despite staff shortages during the early part of FY 1968 and the reduction of the size of the professional staff by the October 31st "ceiling freeze," the department managed to achieve a new high in the actual number of patients and family members served.

6. Increased provision for meeting travel and support for staff attendance at workshops, visits to other hospitals, and enrollment in advanced graduate courses on a part-time basis. In addition to the fact that these "fringe benefits" are important personnel considerations in attracting and retaining professional staff, it is crucial for the continued improvement of the level of our clinical practice that staff be given an opportunity to keep abreast of new developments in a professional field undergoing much change.

7. Recruitment of a local research consultant to replace Dr. Geraldine L. Conner who has served us most ably in that capacity for the past four years.

8. Upgrading of the secretarial positions on the sections to make possible the retention and recruitment of experienced persons.

Neurological Social Work Section

NINDB has three Clinical Care Branches, Ophthalmology, Surgical Neurology, and Medical Neurology, which are somewhat autonomous administratively and which utilize highly specialized staff. Each branch essentially requires and allows a social worker to add a framework of specialized medical, psychological, and social work knowledge to their generic casework skills, enhancing their anticipatory awareness in problem solving in order to give most effective service to patients, both on an inpatient and follow-up basis. Although patients are followed over many years and some have many readmissions, the number of inpatients studied at one time in each of the over 20 distinct diagnostic categories may be few, lending diversity to the inpatient population. This diversity is heightened by such factors as an age range from infancy to over 80, quite varied socio-economic, cultural, and community backgrounds, range in length of hospitalization from a few days to two years, extent of self-responsibility or competence, their disability and prognosis.

Each of the major types of illness creates social problems of a special order characteristic of the particular deficit whether it be blindness, intractible seizures, loss of muscle function, emotional lability, behavioral deviations, loss or impairment of communication, memory, perception. These deficits strike at personality integration, physical independence, family, and vocational adjustment. Medical treatment rewards may be sparse, uncertain, have noxious side effects, yet represent the last hope of anxious patients or relatives who have come from great distances often at substantial sacrifice. Once here the stringent tests, brain surgery, experimental medical treatment, etc., present genuine stress to both patients and their accompanying relatives. There has been an increase this year in the incidence of problems severe enough to require psychiatric intervention. Prognosis for life on discharge may vary from a few weeks to a normal life span with a progressive crippling illness. The main social work emphasis is on planning for living, with maintenance of the best possible social equilibrium here and after discharge.

The section's reports reflect emphasis on services related to reaction to illness, disability, and hospitalization. Services were directed toward prompt evaluation of the social situation and toward enabling the patient and his relative to work through feelings of agitation, helplessness, or depression so that they might then develop ways of making adjustments, when necessary, in attitudes, vocations, family life, or personal care. Because of the frequency of major physical disabilities, assistance was often necessary in arranging for specialized educational or vocational training, physical aids, rehabilitation therapy, or home nursing assistance for those who could be maintained in the community; institutional care for physical or emotional difficulties for those who could not; and counsel for others whose lowered self-reliance required continued support.

Neurology Social Work Section undertook continued casework services to 768 patients and family members during the year for periods of from one to 11 months. Work with families of patients becomes increasingly important when patients cannot be totally self-responsible. In addition to a high incidence of greatly disabled adults, NINDB has had 114 minor patients admitted in an eight month period. Of these, 42 were teenagers, and 28 between the ages of 6 to 12, i.e., of ages where they utilized directly the services of social workers and also where families were of necessity involved in planning. In giving high priority to helping youngsters tolerate hospitalization without increased problems, all units reported emphasis on establishment of early relationships with anxious parents, increase in collaborative work with teacher, psychologist, occupational therapy, physical therapy, and recreation, and involvement in travel plans for unaccompanied minors.

On Ophthalmology again this year the patient population has consisted in great part of patients whose vision is newly, seriously destroyed or vitally threatened and who have not yet made necessary social or emotional readjustments. Blindness is a threat to an individual's total orientation to life; whatever degree of adequacy he has attained is placed in jeopardy. Emotional reactions to blindness or threat of blindness may vary according to the individual's personality organization, but the fear of blindness is universal. With hospitalization, realization of loss may result in agitation, immobilization by depression, or profound resentment that this should happen. These feelings must be expressed and integrated before an individual can make a genuine readjustment. Increasingly, there are a number of troubled people whose reaction to visual difficulties and interaction with other patients on the unit may inhibit fully utilizing the facilities of the Clinical Center. Social work intervention has focused on redirecting of energies, exploration of personal strengths, future planning, moral support, and liaison between hospital and community resources.

On Surgical Neurology, patients have extreme chronic social problems. Some illnesses involve impairment of mental functioning resulting in behavior problems. The presence on this branch of its own Psychology Section and consulting psychiatrist testifies both to the degree of emotional disturbances anticipated and the significance the three neurosurgeons attach in treatment and research to the deviations observed in behavior and mentation. The social work histories and observations have been an important contribution. The Clinical Director has suggested that a collaborative study based on them be done by the psychiatrist and the social worker concerning the emotional reactions of seizure patients. Hospital admission both for seizure patients and those others who tend to deny their illnesses may trigger past conflicts, create heightened tensions, and resulting medical management problems. The social worker has helped the patient and his family to better understand and cope with this behavior. In doing so, the social worker has made good and selective use of his special knowledge of learning theory and the effectiveness of partial reinforcement, with those patients for whom more traditional techniques seem less relevant.

During FY 1968 other special aspects of casework services on the Surgical Branch have related to minor shifts in medical focus. A new trend toward use of hypothermia for those patients for whom the benefit of surgical excision is doubtful has meant casework activity around new and uncertain treatment plans. Extended hospitalizations brought to some patients disruption of plans, prolonged separation from family, threats to jobs or school adjustment, discouragement or sometimes reactive depressions, with all of which the social worker was concerned. Increase in the admissions of young adult arterioveneous malformation patients has meant more arrangements for post-hospital rehabilitation therapy, as well as considerable support around the surgical trial. Interest was high in studies of cerebral spinal fluid which has led to expansion into two separate studies on NIMH with the NINDB worker carrying the social work responsiblity. This meant scheduling and time problems not only in being available to these confused or depressed patients, but to staff on three different units with varied routines and protocols.

Medical Neurology continues to be characterized by severely disabling illness, rapid turnover, doubtful treatment results, and great need for emotional support to both patient and relative. There is a common basis of marked and usually progressive physical disability which brings, in turn, severe dislocation of gross social functioning and roles. Distinctive to this unit this year has been the brief admission of 15 family units for studies of genetic illnesses, such as muscular dystrophy, which activated special guilt feelings amongst mothers. There has been a trend this year also toward undertaking long courses of steriod therapy for some patients and, therefore, longer hospitalizations, separation and family disruption. Anxiety, discouragement, and guilt, are common feelings among patients and relatives. The social worker provided services around these feelings and the reactions to the patient's increasing dependence, the fear engendered by the medical evaluations and tests, and the severe disappointments evoked when treatment does not change the medical picture. Because of the rapid turnover, the social worker must be prepared to move quickly in establishing a relationship and assessing marginal clues. The social worker's involvement in hospital adjustment necessitated collaboration not only with ward personnel but other disciplines, and on discharge extensive use of multi-community resources.

Arthritis and Metabolic Diseases - Allergy and Infectious Diseases Social Work Section

Arthritis and Metabolic Diseases

During FY 1968 social work activity on the NIAMD Section has been characterized by diversity in the kind of diseases under study, age of patients, severity of illnesses and problems encountered by patients. The section experienced a staff vacancy for the first three months of the year and there was need to handle three medical services on referral-only basis. During this period of time it was only possible to provide social work services for approximately 56% of the patients. However, with full staff since October 1967 the section has been able to average about 84% coverage.

On the Arthritis and Rheumatism Service, work with the two principal groups of patients - those with rheumatoid arthritis and those with lupus erythematosus - provided the opportunity for continuity of social work service since there were many readmissions with whom the worker had had substantial previous contact. With both groups of patients, an important long-term problem is the struggle to live a satisfying life in the face of restriction, disability, and disfigurement. Practical planning and introduction to community resources is often essential, but more frequently, the kernel of these patients' difficulties is their own poor self-image, produced or aggravated by the chronic illness. The arthritics who often value themselves chiefly in terms of activity and accomplishments have needed help in accepting other aspects of themselves as being of worth. With lupus patients, usually very young women dealing with the threat to the sense of feminine identity posed by the prohibition against becoming pregnant, the social work task is to try, without minimizing the patient's real disappointment, to partially restore lost sense of worth as a woman. This is made more difficult by the fact that patients are generally not permitted to adopt children. Social agencies generally reject the patient's application because of her uncertain health and poor prognosis.

As coleaders, the social worker and clinical associate on the Hematology Service, have experimented this year by holding a series of group meetings with hemophiliac patients. In spite of the variation in age and background, the patients of this group seem to make excellent use of the opportunity to discuss advances in medical management of hemophilia, let go some of their own fears of a poor prognosis, and review with each other typical problems and solutions in living with this disease. Each member of the group has appeared to make progress in ability to function more independently.

The Section on Human Biochemical Genetics admits two very different kinds of patients, either adults, usually middle-aged men, with tophaceous gout under reasonably good control, or children with a rare disease of poor prognosis such as Nyhan's syndrome, cystinosis or progeria. The most intensive work has been with the pediatric patients. The principal concern is often with the environment to which the child returns after discharge. For example - whether an institutional placement is satisfactory for his needs or whether a family can provide such absolutely basic needs as food and adequate lodging. Extensive work with community agencies is often required. The child's family must live with the long-term stress of knowing that they will ultimately lose the child who requires so much care. These parents characteristically meet their situation with great courage and hard work, and take excellent care of their children; but need repeated acknowledgement of their efforts and abilities to counteract resistance and underlying guilt about genetic aspects of the disease.

On both the Endocrinology and Metabolism Services, there has been a concentration of social work activities with patients who are undergoing surgery, usually thyroidectomy, parathyroidectomy, and occasionally hypophysectomy. This is a different kind of investment from the supportive service offered those patients (such as osteoporotic patients on metabolic balance studies) who are hospitalized for long-term studies and who may not be severely ill. With candidates for surgery, the social worker concentrates on helping them handle the acute emotional crises. This requires repeated opportunities for patients to express concerns about prospective surgery and listening for unrealistic fears or hopes which indicate a need for further clarification by the physician about the medical reality. Several patients with symptoms secondary to an underlying neoplastic process have also been admitted to the Endocrinology Service. These are terminally ill elderly men, sometimes far from home, whose families may need supportive attention almost more than the patients themselves, as they try to come to grips with the prospect of loss at a time when they are without their usual web of family and community relationships.

On the Gastroenterology Service this year, as is so frequently the case, there have been numerous patients with significant emotional difficulties in the presence of substantial medical problems of malabsorption. These patients are characteristically difficult to manage in the hospital. They may be dependent, demanding, and critical, or they may sabotage diagnostic and research processes. It has not seemed wise with patients this troubled and with this degree of illness, to attempt much uncovering of emotional problems but it has seemed useful for the worker to give a good deal of uncritical attention to what the patient will tell about himself. This is a time-consuming process but a worthwhile endeavor with these patients who almost, without exception, are found to have suffered very early in their lives from emotional deprivation and insufficient attention. The social worker's careful listening and acceptance of feelings has a part to play in the overall caretaking atmosphere of the hospital.

There has also been much activity and effort to resolve practical problems of economic need. Where family income is meager, procuring the expensive equipment used in the daily treatment of cystic fibrosis is a real hardship and in many localities, community resources for the provision of this equipment are limited. Other equally important medical needs (such as arrangements for payments of hospital fees for emergency admission in the home community or the local doctor's bills) have been stubbornly difficult to meet. Aside from the most important available private agency resource, The National Cystic Fibrosis Research Foundation, nonpublic help is almost entirely lacking for these children who are not eligible for hospitalization plans. Public resources are frequently spotty and their eligibility requirements exclude many of our families, hardpressed financially though they may be.

Allergy and Infectious Diseases

During FY 1968 the return of some 20 beds to NIAID which had been borrowed by the National Cancer Institute, meant increased social work activity. The caseload of individual patients and families was larger and on one research project the section made use of the Social Work Department's group worker. The uncertainties felt last year at this time about the direction medical research projects might take in this Institute, were resolved by the appointment in March of Dr. Sheldon M. Wolff to the position of Clinical Director.

The two major research endeavors on the National Institute of Allergy and Infectious Diseases, the Fungal Disease Project and Fever Study Project, presented the caseworker with very different problems and opportunities in work with patients.

The fungal disease patients in themselves fall into two groups: (1) those here for what is usually an initial lengthy period of treatment; and (2) those here for brief evaluative follow-up. The first group struggles with long tedious hospitalizations, in some cases with a grave prognosis or difficult treatment procedures. The social worker's central focus with these patients is management of the hospital experience, and the goal is frequently to reduce the loneliness and boredom both by direct casework contacts with the patients and by helping them to use other hospital facilities in a creative way. To undercut the sense of separation and of homesickness the worker helps the patients maintain close contact with their families. In some cases he may use the Clinical Center Patient

Welfare Fund to maintain the families in this area for a time. Discharge planning is important with these patients, particularly those emerging from an illness of many years and needing intensive help to think of themselves as employable. Many of these patients are middle-aged or older and tend to be pessimistic about their future prospects. It is important for the worker to concentrate rehabilitative efforts on those best able to move toward a satisfactory job experience.

The second group of fungal disease patients, those returning for brief check-ups, are often patients who have been known to this Institute for a number of years. Since they are here only a short time, the worker must be alert in reassessing with the patients their current psychosocial situations, what progress has been made in this recuperative period, and the difficulties for which social work assistance may be necessary.

The fever study patients represent many different disease entities, diagnostic perplexities, and psychosocial problems. With some patients, the diagnostic screening process verifies organic illness, with others the condition is thought to be primarily psychiatric. For both, the work-up is a long one and the patients frequently grow resistive and anxious. The worker's common task with both groups is to offer a supportive relationship in the period leading up to the establishment of the diagnosis. Patients in whom an organic illness is found may need social work attention in coming to emotional terms with the news of a sober prognosis or in making plans for a long-term hospitalization elsewhere. The patient whose illness is primarily psychiatric presents, of course, a more difficult problem in social work treatment. There may be a long history of secondary gains from minor physical illness or somatization may represent a patient's best present defense against other problems. There are also cases of frank factitious illness. If the patient is confronted with the psychiatric aspect of this illness and the social worker is well known to him as a supportive and accepting person, he may make excellent use at this point of the casework relationship to deal with his feelings about the confrontation experience, to verbalize resistance, and in some cases, to work toward recognition of his need for psychiatric help after discharge.

The Institute has a number of children usually with a diagnosis of fever of unknown origin or with Chediak-Higashi syndrome. The child patient who has fever of unknown origin, like his adult counterpart, may use organic symptomatology or the pretense of illness to indicate the presence of substantial emotional problems. Parents of these children are very rarely available to provide psychosocial history material. The child's admission is often relatively brief. Thus, the social worker must give prompt and thoughtful attention to the possible meaning of the child's observable behavior.

With the group of young female mononucleosis patients, the section experimented with using a group worker, assigned to Clinical Center, last fall. The worker visited a local college from which many of these patients were admitted and was helpful in preparing them for what to expect during their Clinical Center admission. She was instrumental in introducing recently admitted patients to socializing opportunities afforded in a larger group of young people drawn from all over the Clinical Center.

Cancer Social Work Section

The challenge of optimum care for an unusually stressful and often complex group of patients continues to be the ultimate concern of the Cancer Social Work Section staff. Underlying all of the problems of work with the cancer patient is the connotation of death which its diagnosis continues to have in our culture. The essential contribution of the social worker is intervention through the maximum utilization of casework skills to help patients and their families cope with the stresses while preserving their integrity and dignity.

On the Endocrinology Service the emphasis has continued to be with metastatic breast cancer patients. These are largely recurrent cases whose original surgery was ego-threatening but whose metastasis is not life-threatening in its impact. Adequate casework treatment adds significantly in enabling these patients to verbalize their fears, undergo further medical treatment, and utilize appropriate community resources in preparation for care outside of the hospital.

The Endocrinology Service also has a number of male patients, ages 18-40, with various types of testicular cancer requiring extended chemotherapy and long hospitalization. Most prominent among the patient's many concerns are emotional strains in family relationships and/or financial hardships at home. Frequently multiple deficits in their lives are projected onto the caseworker requiring patience and understanding to meet in part the persistent emotional and reality demands.

A few young women with gestational trophoblastic disease continue to be admitted to the unit as well as a number of children and young people with growth problems. Although these growth problem children are not ill in the conventional sense, infinite problems are present in terms of their feelings about being "different" and the varying reactions of their parents.

On the Solid Tumor-Chemotherapy Service, research studies have continued on chronic myelogenous leukemia, Hodgkin's disease, myeloma, melonoma, and the other lymphomas, including Burkett's tumor, which is often found in the children in Central Africa and more rarely in the United States. Chemotherapy and radiation therapy continue to be used in the treatment of these illnesses. The inevitable side effects of both chemotherapy and radiation involve traumatic reactions, including nausea, vomiting, fevers, and loss of hair, require sustained emotional support to assist patients in coping with their illness, its treatment, the inevitable family financial problems which adhere to long-time illness and hospitalization, and the inevitable fears of death.

The 7-bed Dermatology Service, with a large outpatient group, continues to place its emphasis almost exclusively on the treatment of mycosis fungoides. Because of tremendous pain and unsightly appearance, these patients experience numerous problems in social adjustment and in maintaining meaningful human relationships.

One unit of NCI is composed of two main medical services: (1) the Radiation Service, which primarily treats patients with Hodgkin's disease; and (2) the Leukemia Service, which until March treated patients primarily in their late teens or early twenties.

The Hodgkin's patients are hospitalized for short periods of time before transfer to the Special Ambulatory Care Patients Program where patients live in motels in the community and come into Clinical Center for treatment. It has been noted there is little, either in the community or within the resources of families, to help with their feelings of loneliness and anxiety. Separation from the security of the hospital itself is a factor. Considerable attention is being given through the service to help solve this problem. The adolescent leukemia patients experience a disruption of their normal life activities and relationships, and with repeated hospitalizations find it difficult to resume familiar roles with their families. Perhaps their greatest loss is the sense of future and for this reason they feel a special urgency to prematurely undertake life's major experiences to counteract feelings of worthlessness and despair. The casework goal with these patients is to help them find satisfactions, to set limited short-term goals promoting feelings of achievement, and to promote meaningful relationships to gain a sense of worth. The job placement of several of these young patients in laboratories in the Clinical Center has proven helpful in giving them a sense of personal accomplishment.

The Surgery Service continues to challenge the skill of the social worker in giving service largely on a short-time basis to help with alleviation of the tensions which separation from family produces; interpretation of diagnostic procedures; provision of ego-support during the period of mounting fears as the surgery date approaches; assistance to the patient and his family to accept limitations, and finally preparation for return to the community hopefully to former activities and careers.

The Metabolic Service has been carried on a referral basis. This unit has continued to deal with unique disease syndromes such as Wiskott-Aldrich and porphyria. These unusual disease entities have emotional components which require the extension of understanding and support to counteract the inevitable anxiety which is evoked in families of children with familial defects.

The Pediatric Service continues to be a high stress service with several new areas of service developed this year. The major social work focus has been on the child patient rather than on the family. Efforts have been made to diminish the threat of hospitalization for the child and to normalize as much as possible his experience as a hospital patient. There has been a combined emphasis on work with children as individuals and in groups. It has been recognized that the quality of the relationship of the pediatric social worker with the mother is very dependent on her perception of the social worker's ability to relate to the child. The social worker effectively employed group work methods on this service through (1) an outdoor activity program with the children; (2) group therapy meetings with the children; (3) the continuation of the weekly regularly scheduled mother's group with the pediatrician and social worker; and (4) interdisciplinary team meetings.

Efforts have been made to purposefully utilize social work knowledge to influence total ward atmosphere. A consistent role as a catalytic agent between members of the medical team, and in fact, all concerned has been successfully pursued. In addition, efforts have been made to develop a more individualized approach to the giving of financial help from our Patient Welfare Fund which has proved to be most useful and therapeutic to the families concerned.

In summary, social work on the Cancer Institute continues to deal with catastrophic stress and requires a disciplined use of self, consistent and meaningful interchange with the medical team, and special attention to communication at all levels.

Heart Social Work Section

During the calendar year 1967, 1,119 patients were admitted to five clinical/research branches of the National Heart Institute. In addition to the chiefs of the branches, there were approximately 15 senior investigators who admitted patients related to their special interests. These five programs admit patients to 100 beds. By far the largest number of patients were admitted to the Cardiology Branch. Patients varied from the infant to the elderly and were from many cultural, educational, religious, and socioeconomic backgrounds, from all over the United States and from many other countries, particularly Greece and Puerto Rico.

The patients were admitted for short and long periods and with many and varied disease entities of long-time and new clinical research interests. Many were readmissions. They were fatally or terminally ill people with progressive disabling diseases, admitted for use of experimental drugs but with no hope for cure; they were more strictly research patients with controllable metabolic disorders; they were symptomatic or asymptomatic children with fatal illnesses and with correctable congenital cardiac lesions; they were chronically ill adults for whom medical and/or surgical management was possible but not entirely curative.

The overall goal of the Social Work Department staff has been to integrate their knowledge and skill with those of the medical and paramedical staff in order to assure the patients' maximum adjustment to their illnesses and most constructive use of the clinical/research program. The social worker, in order to reach this goal, must of necessity relate to many investigators and staff, and be knowledgeable of many different diagnoses and research protocols, with their different implications, in order to keep the focus on the patient's own individual identity within this complex setting.

During the calendar year 1967, as in previous years, these patients and their families brought with them fears of pain, death, increasing disability, damage to their bodies, change in role or status, authority, loss of control, rejection, abandonment, punishment, separation, and particularly of the unknown. They came with feelings of inadequacy, loss of self-esteem, hopelessness, helplessness, self-blame, guilt, anger, and fears for their families' present and future, and for their own economic and employment status. They often came with inappropriate or unrealistic goals for their own and their families' future. Patients and their families also came with the kinds of coping mechanisms precipitated by severe stress, i.e., regression, denial, withdrawal, somatization, depression, intellectualization, fantasy, and hyperactivity. They presented different and sometimes difficult personalities, such as the hysterical, compulsive, passive-agressive, dependent, manipulative, and conforming. The children came with their parents whose anxieties relating to parental responsibilities, concomitant guilt, and insecurity, were paramount.

These different personalities with varied medical diagnoses, with different coping mechanisms, with different individual feelings and fears, have been a challenge to the social work s taff. Their modus operandi has been to make as sound a psychosocial evaluation of the individual patient as possible, to share this with the clinical research staff, and to use it as a base from which to work in social work treatment. The interview, reflecting a one-to-one focus is the social worker's primary tool through which she has been able to encourage ventilation of and expression of feelings and expectations, to intervene or communicate with other staff appropriately or to encourage the patient's communication with other staff; to offer realistic reassurance and to use anticipatory guidance based on knowledge of the medical research implications; to offer ego-supportive help, to give appropriate information, and to use constructively the hospital and community resources. These techniques are applicable to both those patients and families having short-term crisis-oriented stress and those hospitalized for longer stressful periods.

In the calendar year 1967, there were 74 non-English speaking patients admitted to the Cariology Branch of the National Heart Institute. The majority of these had cardiac surgery. In addition to major preadmission economic and transportation problems, the fears of a life-threatening disease and/or operation were compounded by the language barrier, the difference in culture, and the overwhelming strangeness of this experience. All attempts of personnel to offer supportive help are blocked and it is not possible to fully describe the social work time and ingenuity required to help these patients. The hiring of an official Greek interpreter in October 1967 has helped, and the cooperation of the women's groups of the local Greek Churches has continued-but this does not begin to meet the need.

From May to December 1967, the resignation of one part-time and three full-time social workers limited ideal social work coverage, shifted expectations of the clinical staff and patients, and compromised the training and supervisory responsibility of the program supervisor. All clinical/research services were affected but the Cardiology and Surgical Programs bore the brunt of these staff changes. Only two replacements were allowed, which meant the program supervisor has to continue major coverage of the Surgical Service, and the two new staff members had to assume very early in their experience here, social work responsibility on Cardiology and Surgery - two different crisis oriented units. A direct result of the changes in staff was reflected in a statistical drop in social work coverage on the Surgical Service, previously 85-90%, to 60% in the calendar year 1967.

In spite of staff changes, 900 of 1,119 patients admitted to the Heart Institute were provided with social work services. There was increased integration of social work into the Clinical Endocrinology and Experimental Therapeutic clinical/research programs, and Social Work Department staff was used more constructively in relation to the diagnostic phase, hospital management, and discharge planning. A sound practice-related, collaborative research project was initiated with the Chief of the Experimental Therapeutic Branch to study patients' expectations of the research protocol for which they were admitted.

Serial No. CC-21
Social Work Department
The Clinical Center
Bethesda, Maryland 20014

PHS-NIH
Individual Project Report
July 1, 1967, through June 30, 1968

Project Title: The Peer Group Phenomenon in Young Women with Cancer

Previous Serial Number: None

Principal Investigator: Belvin R. Blandford

Other Investigators: None

Cooperating Units: None

Man Years

Total:	50 Hours
Professional:	30 Hours
Others:	20 Hours

Project Description: Objectives - The purpose of this study was to describe a naturally formed peer group of hospitalized patients, how it functioned, its strengths and weaknesses, and its use by the caseworker in individual treatment.

Method - In the course of providing casework services to 100 patients with gestational trophoblastic disease treated by the Endocrine Branch, National Cancer Institute, in the Clinical Center between November 1, 1961 and April 30, 1965, observations were made of the peer group phenomenon.

Major Findings - This was a heterogeneous group of women who were aggressive in perpetuating a peer group they usually found mutually supportive. The group functioned well in relieving day-by-day stresses. However, there were areas of concern patients did not discuss as a total group. For instance, they could not tolerate hearing the fears of the dying patients. From the staff, intervention was necessary when the group's encouragement of regressive and infantile behavior became excessive or when it felt overwhelmed by a member's bizarre behavior and/or pervasive anxiety. Although the investigator used traditional casework methods with individual patients, it was necessary to give special attention to excluded patients. For the majority, group support lessened patient alienation and fostered readiness for involvement in casework treatment.

Proposed Course - Project completed. Findings reported in article cited below.

Publications - Blandford, B.R.: Peer group membership of young women with cancer. *Chronic Dis.*, Sept. 1968.

Serial No. CC-21
Social Work Department
The Clinical Center
Bethesda, Maryland 20014

PHS-NIH
Individual Project Report
July 1, 1967, through June 30, 1968

Project Title: The Effect of Cystic Fibrosis on the Social Functioning of Adolescent and Young Adult Patients

Previous Serial Number: None

Principal Investigator: David W. Callagy

Other Investigators: None

Cooperating Units: None

Man Years

Total:	148
Professional:	115
Others:	33

Project Description: Objectives - The purpose of this study is to evaluate and describe the social functioning of 12 adolescent and young adult cystic fibrosis patients (ages 15-26 years),many of whom seem to have educational, economic, and social relationship difficulties that could conflict with their maximum potential for normal living.

Method - Twelve taped, open-ended, one-hour interviews have been completed with adolescent cystic fibrosis patients. This material has been analyzed to determine the common characteristics, current problems, and typical needs of these patients. Major areas of content analysis are financial problems, education, and social relationships.

Principal Findings - The major findings are that psychosocial functioning is within normal limits for the majority of these patients. They do, however, appear to reach adolescent developmental milestones relatively slowly, perhaps because their parents have been oversolicitous and relationships with peers marred by the need to prove their "normalcy." Despite frequent absences from school, patients usually complete high school; some attend college. In this series of patients whose medical care needs are largely met without cost to them; finances have not been a problem.

Serial No. CC-21
Social Work Department
The Clinical Center
Bethesda, Maryland 20014

PHS-NIH
Individual Project Report
July 1, 1967, through June 30, 1968

Project Title: Does Surgical Success in Children with Heart Disease in the Latency and Adolescent Age Groups Result in Significant Positive Changes in Social Functioning

Previous Serial Number: None

Principal Investigator: Barbara A. Murphy

Other Investigators: None

Cooperating Units: Clinical social workers assigned to Cardiology Branch, NHI

Man Years

Total:	110 Hours
Professional:	100 Hours
Others:	10 Hours

Project Description: Objectives - The purpose of this Study is to learn whether children who have been physically improved by cardiac surgery experience concomitant changes in social functioning as measured by their ability to perform age-appropriate tasks before and after surgery.

The project will study the functioning of two groups of children (1) those in latency period (6 through 10 years) and (2) those in the adolescent period (14 through 17 years), who were admitted to the Heart Institute of the Clinical Center, NIH. The children will have been judged by the surgeon as physically improved following operation.

Method: The developmental theories of Freud, Erikson, Josselyn, and others have been used as a basic frame of reference for determining the significant life tasks of childhood. The theoretical developmental tasks have been translated into a series of perceivable behaviors. From these a schedule has been devised, containing a series of questions concerning life tasks as they relate to latency and adolescence.

Barbara A. Murphy Serial No. CC-21

Does Surgical Success in Children with Heart Disease in the Latency and Adolescent Age Groups Result in Significant Positive Changes in Social Functioning

The children are used as the primary source of data. The schedule is administered in an interview situation at two different points of time: before surgery and following a medically appropriate period after surgery. A supplementary schedule for the available parent is also administered in an interview situation at two different points in time-prior to and following surgery.

Schedules have been devised to provide information related to (1) the patient's functional capacity preoperatively and postoperatively (2) whether corrective or palliative surgery was performed, and (3) the surgeon's judgment as to those patients whose cardiac status was improved.

Data collection was initiated in January 1964, and to date 90 patients and 86 parents have been interviewed. Of these, 35 patients, 25 latency children and 10 adolescents, have had surgery. Postsurgery follow-up interviews have been conducted with 20 patients and one of their family members.

Proposed Course: As of December 1966 interviews for the latency group have been limited to those patients where the need for surgery is fairly well established at the time of admission. Due to the small size of the adolescent group, all patients will continue to be interviewed.

A scale using social work judgment is being developed to assess the patient's level of social functioning in relation to the significant tasks of latency and adolescence before and after surgery.

Serial No. CC-21
Social Work Department
The Clinical Center
Bethesda, Maryland 20014

PHS-NIH
Individual Project Report
July 1, 1967, through June 30, 1968

Project Title: Evaluation of Social Functioning of Male Patients Following Replacement of Their Aortic or Mitral Valves

Previous Serial Number: None

Principal Investigator: Roberta E. Peay

Other Investigators: Dr. Andrew G. Morrow, Surgical Branch, NHI

Cooperating Units: Surgical Branch, NHI

Man Years

Total:	60
Professional:	50
Others:	10

Project Description: Objectives - To evaluate the social functioning of 70 male patients who have had either their mitral or aortic valve replaced with a Starr-Edwards valve prosthesis, since 1963, at the Surgery Branch, NHI.

Method - This project will evaluate, with a postsurgical questionnaire, the social functioning, particularly in the area of employment, of these patients at least one year following their operations. The social functioning will be correlated with the postoperative evaluations done by the cardiologists and cardiac surgeons.

Major Findings - The last questionnaires have been mailed to those men who had either mitral or aortic valve replacements up until December 1965, and have been returned to principal investigator. The data is in the process of being analyzed.

PROFESSIONAL ACTIVITIES

Miss Mary Dean Aber

Attended Seminar "Family Roles in Family Counseling," at Walter Reed Army Hospital, Washington, D. C., August 1967.

Completed Course "Doctoral Seminar in Social Casework," at Catholic University School of Social Work, Washington, D. C., September 1967 through January 1968.

Attended "Conference on the Chronically Ill Child and His Family," at the Johns Hopkins Hospital, Baltimore, Maryland, April 1968.

Mrs. Belvin R. Blandford

Member, Practice Committee, Northern Virginia Section National Association of Social Workers

Miss Marian A. Braye

Completed Course "Doctoral Seminar in Social Casework," at Catholic University School of Social Work, Washington, D. C., September 1967 through January 1968.

Attended "Conference on the Chronically Ill Child and His Family," at the Johns Hopkins Hospital, Baltimore, Maryland, April 1968.

Presented Monthly Lectures on Social Work throughout the year to new nursing staff at Clinical Center, National Institutes of Health.

*Mr. Lawrence D. Burke

Participated in an "Institute on Human Relations in Inter-Group Understanding," at Catholic University of America, Washington, D. C., July 1967.

Participated in a Symposium for Instructors of Nurses, sponsored by the National Cancer Institute and the American Cancer Society, Clinical Center, National Institutes of Health, November 1967.

Presented a Lecture on "How Cultural and Racial Factors Affect the Casework Relationship," to the Casework Class of Howard University School of Social Work, Washington, D. C., December 1967.

---

*Former Member of the Social Work Department.

*Mr. Lawrence D. Burke

Participated in a Nursing Care Conference on "The Wiskott-Aldrich Syndrome," presented by the Cancer Nursing Service, Clinical Center, National Institutes of Health, February 1968.

Member, Montgomery County Commission on Human Relations.

Mrs. Libby E. Ely

Attended American Orthopsychiatric Association Conference, Chicago, Illinois, March 1968.

Mrs. Kathryn K. Himmelsbach

Member, Inter-Agency Services Conference and Program Committee of the Health and Welfare Council
Metropolitan Area of District of Columbia

Participated in a Panel Discussion entitled "Meeting the Patients' Needs with Improved Communications," sponsored by the Saint George Society in cooperation with the American Cancer Society, District of Columbia Division, Washington Hospital Center, Washington, D. C., March 1968.

Mrs. Gilda M. Ludwig

Attended "Conference on the Chronically Ill Child and His Family," at the Johns Hopkins Hospital, Baltimore, Maryland, April 1968.

Mrs. Lucia N. Mason

Attended Seminar "Family Roles in Family Counseling," at Walter Reed Army Hospital, Washington, D. C., August 1967.

Miss Barbara A. Murphy

Attended Seminar "Family Roles in Family Counseling," at Walter Reed Army Hospital, Washington, D. C., August 1967.

Member, Ad Hoc Review Team for the HEW Health Services Research Study Section.

Attended "Gordon Hamilton Symposium on Social Work," sponsored by Columbia University School of Social Work, New York, N. Y., March 1968.

Presented paper "Dealing with Stress: The Nurse and Caseworker in Pediatric Settings," at Meeting of the American Association for Child Care in Hospitals, Cleveland, Ohio, May 1968.

---

*Former Member of the Social Work Department.

Miss Roberta E. Peay

Attended American Orthopsychiatric Association Conference, Chicago, Illinois, March 1968.

Mr. A. Robert Polcari

Attended American Orthopsychiatric Association Conference, Chicago, Illinois, March 1968.

Mr. John F. Roatch

Chairman, Council on Social Work in Medical and Health Services
National Association of Social Workers
July 1967 through June 1970.

Chairman, National Ad Hoc Committee on Titles 18 and 19, Division of Practice and Knowledge, National Association of Social Workers.

NIH Bureau Representative for the Evaluation, Selection and Placement of Applicants for Appointment in the Commissioned Corps.

Member, HEW Grievance Review Officer Panel.

Member, Ad Hoc Review Team for the HEW Health Services Research Study Section.

Member, Ad Hoc USPHS Sub-Committee on Career Development for Social Work.

Member, "Sub-Committee on Recruitment," DHEW Career Service Board for Social Work.

Member, Executive Committee, Council on Social Work in Medical and Health Services, Metropolitan Washington Chapter, NASW.

Discussed Clinical Center Social Work Department's Program at a Combined Meeting of the Walter Reed Army Hospital Social Work Department and the Child Psychiatry Staff, Washington, D. C., July 1967.

Discussed Clinical Center Social Work Department's Program with the First Year Graduate Class of the Howard University School of Social Work, October 1967.

Attended a Joint Chaplain and Social Work Discussion, "Common Problems Presented in Working in a Hospital Setting," at Walter Reed Army Hospital, Washington, D. C.,February 1968.

Attended National Conference on Social Welfare, San Francisco, California, May 1968.

Mrs. Elizabeth G. Schumann

Presented a Paper "Social Aspects of Illness," as part of the NINDB Clinical Center Nursing Conference, National Institutes of Health, January 1968.

*Miss Carolyn V. Silverstein

Visited Chestnut Lodge, Rockville, Maryland for "Orientation to Group Work Program," September 1967.

Visited Johns Hopkins Hospital, Baltimore, Maryland, for "Orientation to Group Work Program," October 1967.

Visited Montefiore Hospital and New York University Hospital, New York, N. Y., for "Orientation to Group Work Program," October 1967.

Miss Juanita M. Todd

Visited Memorial Hospital for Cancer Research, New York, N. Y., May 1968.

Miss Evelyn Walker

Member, Women's Board, Columbia Hospital, Washington, D. C.

Member, Board of Directors, Homemaker Service of Metropolitan Area, Washington, D. C.

Member, Civil Service Examiners Board.

Member, USPHS Appointment Personnel Boards.

Member, Abstract Committee
National Association of Social Workers.

Member, Ad Hoc USPHS Sub-Committee on Career Development for Social Work.

Mr. Kenneth R. Wedel

Attended "Conference on the Chronically Ill Child and His Family," at the Johns Hopkins Hospital, Baltimore, Maryland, April 1968.

---

*Former Member of the Social Work Department.

TABLE 1
INPATIENT COVERAGE BY PERCENTAGE SERVED EACH MONTH

July 1967 through March 1968

SECTION	TOTAL* IN-PATIENTS CENSUS	IN-PATIENTS SERVED	PERCENT COVERAGE
NCI	1,914	1,209	63
NHI	1,452	1,197	82
NIAMD	612	455	74
NIAID	436	318	73
NINDB	901	715	79
TOTAL	5,315	3,894	73

* Normal Volunteers not normally served are excluded.

TABLE 2
NUMBER OF CLIENTS SERVED EACH MONTH

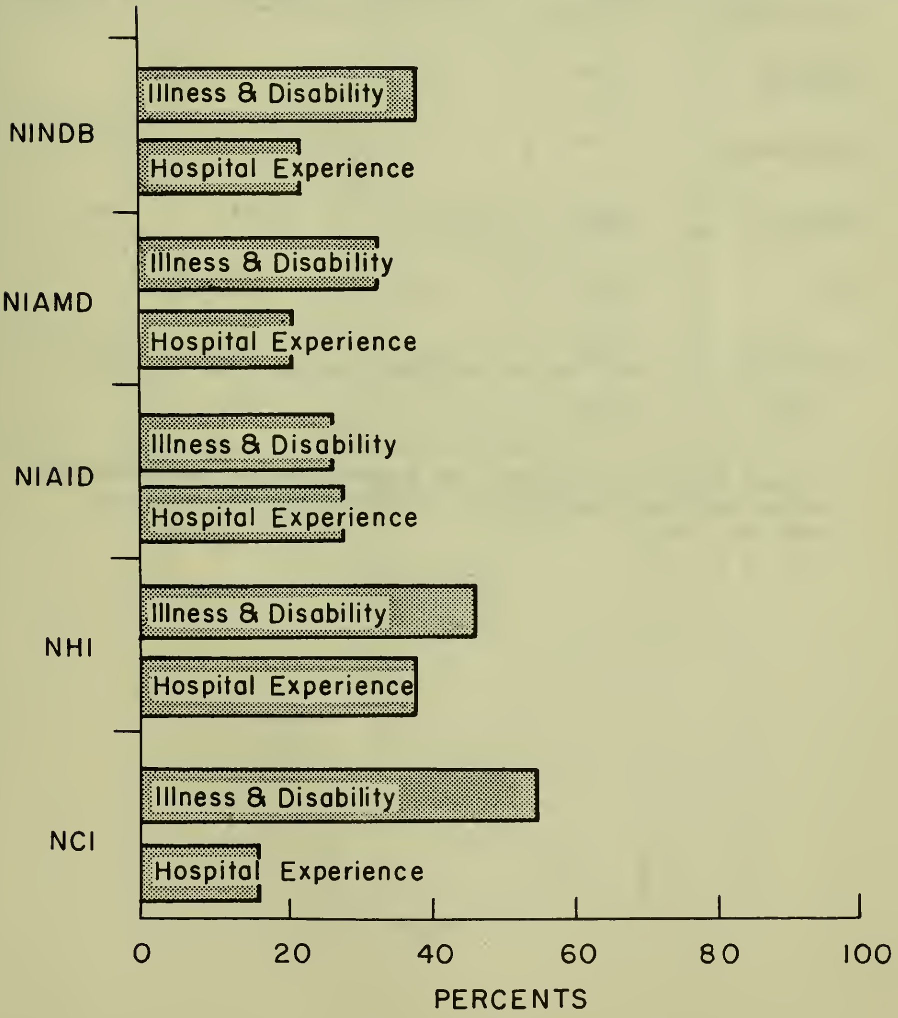
July 1967 through March 1968

SOCIAL WORK SECTION	SCREENING(1)		PRE-ADMISSION(2)		IN-PATIENT(3)		CLINIC(4)		FOLLOW-UP(5)		TOTAL CC PATIENTS	TOTAL FAMILY MEMBERS
	CC PATIENT	FAMILY MEMBER	CC PATIENT	FAMILY MEMBER	CC PATIENT	FAMILY MEMBER	CC PATIENT	FAMILY MEMBER	CC PATIENT	FAMILY MEMBER		
1967 JULY	-		1		382		5		55		443	
		-		-		213		-		21		234
AUG.	-		1		372		14		54		441	
		-		-		185		5		19		209
SEPT.	-		1		393		16		50		460	
		-		1		183		4		20		208
OCT.	-		2		405		17		76		500	
		-		1		172		7		30		210
NOV.	-		1		485		26		103		615	
		-		-		238		20		33		291
DEC.	-		-		397		17		110		524	
		-		-		210		7		28		245
JAN.	-		-		460		26		112		598	
		-		-		222		17		21		260
FEB.	-		5		503		36		103		647	
		-		3		240		19		41		303
MAR.	-		2		497		25		124		648	
		-		-		207		10		40		257
TOTAL	-		13		3,894		182		787		4,876	
		-		5		1,870		89		253		2,217

(1) SCREENING - Exploratory contacts to determine suitability for admission.
(2) PRE-ADMISSION - Service between acceptance for project and admission.
(3) IN-PATIENT - Person occupying a Clinical Center bed at any time during month.
(4) CLINIC - Service where patient has never been an in-patient.
(5) FOLLOW-UP - Service to former in-patient.

TABLE 3

MAJOR CONCENTRATION OF PROBLEMS ON EACH INSTITUTE BY PERCENT OF TOTAL SERVICES TO PATIENTS AND FAMILIES FISCAL YEAR 1968 *



* For Period July 1967 through March 1968

TABLE 4
SUMMARY OF MONTHLY TOTALS OF PATIENTS SERVED

Service Categories	FY 1967* Patients Served July 1966 - March 1967		FY 1968 Patients Served July 1967 - March 1968	
	Number	% of Total	Number	% of Total
Screening	126	2.7	-	-
Preadmission	30	0.6	13	0.3
Inpatient	3,933	83.6	3,894	80.0
Clinic	167	3.6	182	3.7
Follow-up	448	9.5	787	16.0
TOTAL	4,704		4,876	

* Includes figures for only July and August 1966 from Mental Health Section which was transferred out of Social Work Department on August 31, 1966.

TABLE 5
GROUP ACTIVITY REPORT

July 1967 through March 1968

SECTION	RESEARCH ACTIVITIES		PRACTICE-PROGRAM ACTIVITIES		SOCIAL WORK DEPARTMENTAL ACTIVITIES		COMMUNITY AND PROFESSIONAL ACTIVITIES		TOTAL
	HOURS	%	HOURS	%	HOURS	%	HOURS	%	HOURS
NCI	56	3	1,052	60	564	32	81	5	1,753
NHI	48	3	1,038	65	456	29	44	3	1,586
NIAMD NIAID	38	3	587	52	491	43	19	2	1,135
NINDB	81	8	426	42	401	39	113	11	1,021
TOTAL	223		3,103		1,912		257		5,495

TABLE 6
PATIENT WELFARE FUND EXPENDITURES

July 1967 through March 1968*

YEAR AND MONTH		SPECIAL PROGRAMS	PATIENT TRANSPORTATION	ALLOWANCE TO RELATIVES	PATIENT MISCELLANEOUS	BASIC NECESSITIES	TOTAL WITHDRAWN
1967	JULY	$ 2.00	$ 3.80	$ 1,145.60	$ 70.25	$ 180.50	$ 1,402.15
	AUGUST	29.75	69.74	924.00	150.16	213.00	1,386.65
	SEPTEMBER	35.00	21.00	792.40	145.51	142.50	1,136.41
	OCTOBER	15.00	105.25	1,351.00	196.65	135.25	1,803.15
	NOVEMBER	18.00	54.50	975.70	118.75	140.00	1,306.95
	DECEMBER	79.00	120.28	694.75	117.47	89.50	1,101.00
1968	JANUARY	32.00	76.55	414.00	41.00	116.75	680.30
	FEBRUARY	82.25	21.15	229.00	128.78	118.25	579.43
	MARCH	7.00	59.75	699.00	47.30	116.00	929.05
	APRIL						
	MAY						
	JUNE						
TOTAL		$ 300.00	$ 532.02	$ 7,225.45	$ 1,015.87	$ 1,251.75	$ 10,325.09
RECAPITULATION		Balance brought forward July 1, 1967					$ 6,259.64
		*Fiscal Year (1968) - Deposits					13,416.90
							$ 19,676.54
		*Fiscal Year (1968) - Withdrawals					10,325.09
		TOTAL					$ 9,351.45

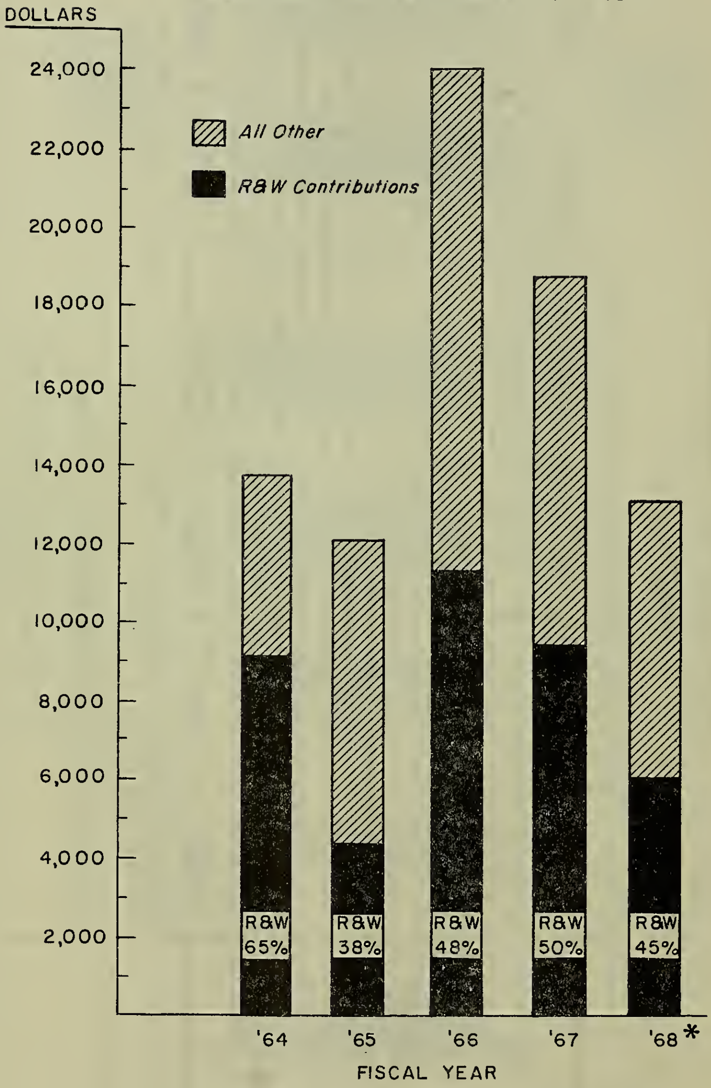
TABLE 7
PATIENT WELFARE FUND EXPENDITURES

Fiscal Year 1967

YEAR AND MONTH		SPECIAL PROGRAMS	PATIENT TRANSPORTATION	ALLOWANCE TO RELATIVES	PATIENT MISCELLANEOUS	BASIC NECESSITIES	TOTAL WITHDRAWN
1966	JULY	$ 24.40	$ 26.44	$ 952.50	$ 237.95	$ 159.50	$ 1,400.79
	AUGUST	.60	156.56	1,595.50	123.00	258.50	2,134.16
	SEPTEMBER	5.00	15.00	1,450.48	141.50	198.50	1,810.48
	OCTOBER	30.00	50.00	1,020.00	159.75	247.50	1,507.25
	NOVEMBER	4.60	35.00	1,053.50	105.00	285.00	1,483.10
	DECEMBER	15.00	145.57	2,129.77	162.13	256.50	2,708.97
1967	JANUARY	-	37.00	1,827.75	129.14	339.75	2,333.64
	FEBRUARY	-	38.20	1,645.52	112.90	257.25	2,053.87
	MARCH	3.70	20.00	1,395.00	208.81	337.80	1,965.31
	APRIL	15.00	51.05	1,408.00	87.78	230.50	1,792.33
	MAY	-	8.40	1,692.00	145.56	257.00	2,102.96
	JUNE	3.50	25.55	789.00	143.25	215.15	1,176.45
TOTAL		$ 101.80	$ 608.77	$16,959.02	$ 1,756.77	$ 3,042.95	$ 22,469.31

RECAPITULATION	Balance brought forward July 1, 1966	$ 9,808.93
	Fiscal Year (1967) - Deposits	18,920.02
		$ 28,728.95
	Fiscal Year (1967) - Withdrawals	22,469.31
	TOTAL	$ 6,259.64

TABLE 8
PATIENT WELFARE FUND INCOME
COMPARISON OF R&W CONTRIBUTIONS TO ALL OTHER CONTRIBUTIONS FY '64–'68 *



* July 1967 through March 1968

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DEPARTMENT OF SPIRITUAL MINISTRY

CC-43
Serial No.

TABLE OF CONTENTS

Overview SM-1

Chapel Service SM-2

Pastoral Ministry to Patients and Their Families SM-3

Illustrations of Pastoral Ministry SM-4

Pastoral Training for Clergy SM-5

Orientation of Staff SM-6

Monthly Chaplain Seminars SM-6

Research SM-7

Professional Meetings (Chaplaincy) SM-7

Professional Meetings (Ecclesiastical) SM-8

Lectures SM-9

Community Contacts SM-9

July 1, 1967, through June 30, 1968

PUBLIC HEALTH SERVICE, NATIONAL INSTITUTES OF HEALTH

SUMMARY ANNUAL REPORT OF PROGRAM ACTIVITIES
CLINICAL CENTER

DEPARTMENT OF SPIRITUAL MINISTRY

CC-43
Serial No.

OVERVIEW

The basic task of the department is to make available to patients and their families a religious and spiritual ministry. As hospital-based clergy, members of the staff conduct religious services in the interfaith chapel, visit patients and their families, consult with Clinical Center staff members, and act as liaison with religious groups not represented by staff chaplains.

Rabbi Maurice Kleinberg joined the staff of the department on November 7, 1968. Prior to coming to the Clinical Center, Rabbi Kleinberg served with the Army as a chaplain, including eleven years at Walter Reed Medical Center. He serves 20 hours a week in the Clinical Center.

The training of clergymen assumed an increasingly important role in the department. Training of clergymen helps to increase the day-by-day coverage to patients and assure "feed-back" that strengthens the total program of the department. Clergymen in training come as "guest workers" on a 40-hour-week basis. Interest in hospital-based training for chaplains was indicated by representatives of the Army and Navy, and eventuated in a training program for four chaplains (three Army and one Navy) in the spring quarter. Chaplain Robey supervised this program.

With the help and work of Professor John C. Fletcher, a "guest worker" in the department, a small beginning was made in research. Professor Fletcher worked with normal volunteers during the summer studying the problem of "informed consent." Informal discussions were held with staff members of the various Institutes and a research study was proposed by Professor Fletcher.

Members of the department were involved in a variety of community concerns of local churches, council of churches, denominations, chaplaincy organizations, and training organizations.

Limitations of staff and time circumscribed some of these endeavors and at times fragmented efforts. Increase in staff and the availability of training funds are needed to meet the overwhelming challenges of the department.

CHAPEL SERVICE

Regular Chapel Services were held during the year by the various chaplains. These services were:

Protestant: Sunday, 10:00 a.m. Holy Communion Service, the first Sunday of each month.

Catholic: Sunday, 7:15 a.m. and 8:30 a.m., and weekdays, 11:15 a.m. Daily distribution of Communion to bedridden patients.

Jewish: Friday, 4:00 p.m., and Saturday, 9:30 a.m.

In addition to these regular services, special services were also held, including:

Protestant:
World Wide Communion - 1st Sunday in October
Thanksgiving Day Service
Christmas Carol Service
Good Friday Service

Catholic:
Holy Days of Obligation - 2 Masses
Daily Rosary Services - during the months of October and May
Distribution of Ashes (Ash Wednesday)
Stations of the Cross - Fridays during Lent

Jewish:
Rosh Hashanah
Yom Kippur
Sukkoth
Chanukah
Purim
Passover
Shavuoth

The Protestant and Catholic chaplains circulated a joint Christmas greeting. Again this year, Catholics were urged to attend Protestant Good Friday Services. This was essentially a biblical service and was one of the areas in which cooperation is possible and desirable. Chaplains from the department participated in the joint Christmas-Chanukah Concert with the Patient Activities Section.

The three Protestant Chaplains rotated Sunday duty, which included conducting the Protestant Chapel Service. This helped patients and their families who came to the Chapel to identify and to know each of the Protestant chaplains. The theological students who were enrolled in the summer course in Clinical Pastoral Training took turns preaching in the Chapel. They were guided and supervised in their preparation and presentations by one of the chaplains.

Daily Mass, scheduled at 11:15 a.m., was attended regularly by a number of patients. Attendance varied from 10 to 20 each day with an attendance of 30 to 40 during Lent. About 90% of those who attend were patients or their relatives.

Relatives of patients, especially seriously ill patients of the Heart and Cancer Institutes, expressed their comfort in being able to attend daily Mass. During this time of distress and the feeling of helplessness, the community prayer at Mass was very desirable. On some occasions the Blessed Sacrament Chapel was used. More went there in the evening to pray than at any other time.

Holy Communion was distributed to Catholic bed patients each day starting at 10:15 a.m. About 25 bed patients received daily, in addition to those who received Holy Communion at the daily Mass. Confessions were heard daily before Mass. The Sacrament of the Anointing of the Sick was given with increased frequency.

The time of Sabbath Evening Service was changed from 1:30 p.m. to 4:00 p.m. to comply with Jewish ritual requirements. Sabbath Morning Service was instituted, affording Jewish patients an opportunity to fulfill all their religious obligations.

Special festive celebrations were held for Chanukah and Purim. Gifts were distributed to patients. Passover celebration included a Seder meal service conducted in the Interfaith Chapel. Essentials were furnished by the Nutrition Department, which also arranged to have matzos available on the menu for Passover Week.

A bedside booklet "Prayers for the Sick," compiled from Jewish prayer cards, was reproduced. It was distributed to Jewish patients on initial visits and this will become a routine procedure.

PASTORAL MINISTRY TO PATIENTS AND THEIR FAMILIES

The heart of the work of the Department of Spiritual Ministry continued to be the ministry to individual patients and their families. Patterns of ministry vary according to the traditions of the major faiths. Pastor, Priest, and Rabbi each has his unique approach to meet the spiritual needs of his patients. Methods in ministry also vary according to the ratio of patients to individual chaplains.

All Catholic patients were contacted through the sacramental ministry of the Catholic Chaplain. The Jewish Chaplain was able to see all patients of the Jewish faith. Because of the number of Protestant patients, Protestant Chaplains were not able to visit every one. Priority was given to the terminally ill, the seriously ill, and those scheduled for surgery. All referrals by staff, relatives, pastors, or self were seen. As many other patients were visited as time permitted. Clergymen from the community were called upon to minister to special patients, e.g., patients requesting special rites from a clergyman of their own denomination.

Several Greek Orthodox priests were routinely called to minister to the Greek-speaking patients on the Heart units.

Pastoral problems which the chaplains encountered included: loneliness, grief, fear, guilt, anxiety, loss of spiritual meaning, and boredom. Pastoral methods included pastoral conversations, sacraments, blessings, prayer, scripture, and worship. On occasion, the chaplains were involved in helping patients and their families resolve dilemmas of conscience, conflicts of values, and difficulties in accepting radical therapies.

The use or non-use of the clerical collar was discussed. Father Guicheteau reported that most Catholic patients, upon seeing it, immediately acted as if meeting an old friend. It is a little bit of home to those not yet familiar with their new hospital situation.

ILLUSTRATIONS OF PASTORAL MINISTRY

The following case notes were written by chaplains. Perhaps they best communicate the activities of the Department of Spiritual Ministry in its work with patients and their families during FY 1968:

> "Miss A. accompanied her mother to the Clinical Center. She remained until her mother's death several months later. Miss A. was quite distraught at the end, although her mother's death was not unexpected. She declared she did not intend to return home for the funeral, although a younger sister had come for the last days of their mother's illness. Miss A. planned to stay in Bethesda with 'Mom's spirit.' Pastoral counseling and advice helped her to see the wisdom of going back to her home state to be with her family at the time of the funeral. She later wrote to thank me for help 'when it was needed so badly' and said she now appreciated the fact that she would not have been happy in Bethesda without her mother."

> "Mrs. B. was notified one evening of the death of her brother. Her doctor felt it unwise for her to return home at that time. She requested to see the chaplain with whom she had already discussed her brother's serious illness and how it confronted her with the threat of death in her own illness. She felt grief at his death, and guilty because she could not immediately go to his family. She again shared with me her thoughts and fears of death. After the pastoral conversation and a prayer, I placed a call to the brother's family and Mrs. B. was able to share her grief with them. When I visited her the next morning, Mrs. B. wondered if she might dress and sit in the chapel at the time of her brother's funeral. I agreed this would be helpful and offered to read portions of the service and prayers for her. This was done and the experience was deeply meaningful to her."

> "I was informed by a member of the Social Work Department that a 10-year-old Israeli girl was being admitted for possible heart surgery and that neither she nor her mother could speak

English. I met the family on arrival, acted as interpreter, and stayed with the child during a catherization procedure where the mother was not permitted in order to have someone interpret to her what was taking place. As a result, the patient cooperated well. The physician remarked, 'Rabbi, I don't know what you are saying to her but it is working very well.'"

"Mrs. D. was visited regularly and often during the last nine months of her life which were spent at the Clinical Center. She mentioned that she especially appreciated the visits of one of the seminarians during the summer, and both he and she benefitted from their talks. The patient's husband was a minister on leave from a teaching position. Many discussions were held with him. Two months following the patient's death, her husband returned to the Clinical Center and sought information about entering a program of clinical pastoral education as well as how he might come to the Clinical Center as a normal volunteer."

PASTORAL TRAINING FOR CLERGY

On August 4, 1967, six seminarians, four from Virginia Theological Seminary (Episcopal), one from Boston University School of Theology (Moravian), and one from St. Paul's College (Roman Catholic), completed an 11-week quarter of clinical pastoral education at the Clinical Center. This ecumenical program was of benefit to the participants by broadening their understanding concerning the relationship of religion to medicine and to illness and health. It also made a significant contribution to the work of the Department of Spiritual Ministry, and to the Clinical Center patients and their families.

Assistance was again given by Chaplains Robey and Kerney to three seminaries, Virginia Theological School (Episcopal), Gettysburg Theological Seminary (Lutheran), and St. Paul's College (Roman Catholic) by interviewing a number of their students applying for courses in clinical pastoral education.

Beginning March 6, 1968, and concluding May 15, 1968, a program of clinical pastoral education was conducted for a group of four professional military chaplains, three from Walter Reed Army Medical Center and one from the National Naval Medical Center. These chaplains came as guest workers and sought this course, at considerable personal sacrifice of time, in order to move toward certification according to the Standards of the Association for Clinical Pastoral Education, Incorporated. Because of their wide professional experience, they were able to contribute very helpfully to the patients and staff of the Clinical Center, as well as to the staff chaplains.

Chaplains Robey and Kerney were active in numerous meetings of committees, regionally and nationally, during the time of the formation and incorporation of the Association for Clinical Pastoral Education, Inc., a new organization formed by the coming together of four previously separate organizations concerned with clinical pastoral education.

On May 27, 1968, five seminarians (four Protestant and one Roman Catholic) began a program of clinical pastoral education for the summer quarter. This annual program is anticipated by many of the personnel of the Clinical Center, as well as those patients who have been here during past summers.

ORIENTATION TO STAFF

The Department of Spiritual Ministry welcomed the opportunity to participate in the various orientation programs of the Clinical Center. These included nursing personnel, clinical associates, social workers, and American Red Cross Hospital Volunteers.

Much of the orientation process took place on an informal basis at the nursing stations, the lunch table, and in consultation with staff personnel. The chaplains made "rounds" occasionally with staff physicians and attended a number of clinical conferences.

MONTHLY CHAPLAIN SEMINARS

A joint monthly seminar was held for chaplains from the Clinical Center, National Naval Medical Center, and Walter Reed Medical Center. The place of meeting rotated among the three centers. One of the important "side effects" of the seminars was the interest they created in clinical pastoral education for chaplains in the armed services.

List of Seminars:

Report on the Association for Clinical Pastoral Education -
Chaplain Robey, Clinical Center

Report on "An Experimental Group in Operant Conditioning" -
Chaplain Polhemus, Walter Reed Medical Center

"Psychology of the Adolescent" -
Dr. Cummins, National Naval Medical Center

Report on National Association of Catholic Chaplains -
Father Guicheteau, Clinical Center

Panel on "Collaboration of the Psychiatrist, Social Worker and Chaplain" - Chaplain Heckard, Walter Reed Medical Center

Report on the Tissue Bank of the National Naval Medical Center -
Dr. E. L. Dupress, National Naval Medical Center

"Ministering to the Cancer Patient" -
Chaplain Kerney, Clinical Center

"Modern Therapeutic Techniques" -
Col. Mueller, Walter Reed Medical Center

RESEARCH

As a "guest worker" in the Department of Spiritual Ministry, Professor John C. Fletcher studied some of the moral problems involved in medical research. He is the author of an article entitled "Human Experimentation: Ethics in the Consent Situation," published in the Journal of Law and Contemporary Problems.

Professor Fletcher and Chaplain Kerney held informal conferences with staff members of the various Institutes on the general topic of "Moral Problems in Medical Research." These conferences were held for the purpose of alerting the Department of Spiritual Ministry to current thinking in the field, offering Institute staff persons a small, informal group to look at areas of concern, and assisting Professor Fletcher in gathering background material for part of a doctoral dissertation on the subject of ethics and medical research.

A Clinical Research Project was proposed by Chaplain Kerney and Professor Fletcher under the title of "Exploratory Study of the Consent Situation in Clinical Research." This was an attempt to carry out an empirical exploratory study on the consent situation.

PROFESSIONAL MEETINGS (Chaplaicy)

National Association of Catholic Chaplains
Philadelphia, Pennsylvania, Father Guicheteau

American Protestant Hospital Association, College of Chaplains
Cleveland, Ohio - Chaplain Kerney

Association for Clinical Pastoral Education
Mid-Atlantic Region, Spring Meeting
Richmond, Virginia, Chaplains Kerney and Robey

Sibley Hospital Symposium on Pastoral Care to Suicidal Persons
Washington, D.C., Chaplain White

Workshop for Institutional Chaplains, Presbyterian Church, U.S.
Atlanta, Georgia, Chaplain White

Executive Committee, Mid-Atlantic Region of the Council for Clinical Training, Inc., Laurel, Maryland - Chaplain Robey

Business Meeting, Mid-Atlantic Region, Council for Clinical Training, Inc., Winston-Salem, North Carolina - Chaplain Robey

Ad Hoc Meeting, Certification Committee, Mid-Atlantic Region, Council for Clinical Training, Inc., Richmond, Virginia - Chaplain Robey

Annual Conference, Association for Clinical Pastoral Education
Kansas City, Missouri - Chaplain Robey

Spring Regional Meeting, Mid-Atlantic Region
Association for Clinical Pastoral Education
Richmond, Virginia - Chaplains Robey and Kerney

Ad Hoc Meeting, Mid-Atlantic Regional Certification Committee
Association for Clinical Pastoral Education, St. Elizabeths Hospital
Washington, D.C. - Chaplain Robey

Accreditation Visit to Central State Prison
Raleigh, North Carolina - Chaplain Robey

American Association of Marriage Counselors
Regional Meeting, Washington, D.C. - Chaplain Kleinberg

PROFESSIONAL MEETINGS (Ecclesiastical)

Workshop on Pastoral Ministries, Manresa-on-Severn
Annapolis, Maryland - Father Guicheteau

Meetings of Jesuit Self-Study (bi-weekly)
Bethesda, Maryland - Father Guicheteau

Annual Regional Meeting of the Central Conference of American Rabbis, Baltimore, Maryland - Chaplain Kleinberg

The Bethesda-Chevy Chase Ministerial Association
Chaplains Kerney, Robey, and White (monthly)

The United Presbyterian Church in the U.S.A.
Presbytery of Washington City - Chaplain Kerney (monthly) 6 meetings

The United Presbyterian Church in the U.S.A.
Synod of Chesapeake, Westminster, Maryland - Chaplain Kerney

Home and Family Nurture Conference
Massanetta, Virginia - Chaplain White

Potomac Presbytery (6 meetings) - Chaplain White

LECTURES

Southeastern Surgical Congress
Panel Discussion on "Basic Rights of Patients" for Surgical Nurses
Washington, D.C. - Chaplain Kerney

Physician-Clergy Symposium
The Medical Society of the District of Columbia
Panel Discussion on "Hospital Calling"
Washington, D.C. - Chaplain Kerney

COMMUNITY CONTACTS

Members of the Department of Spiritual Ministry had numerous contacts with nearby churches, parish clergy, hospital chaplains, visiting doctors, and other professional persons. A number of reserve chaplains assigned to the Naval Medical Center visited NIH. They viewed the orientation film and were taken on a brief tour of the Clinical Center.

Contacts with the community help members of the Department of Spiritual Ministry to understand community situations from which patients come and, in turn, give some interpretation and share insights that emerge from their hospital ministry.

Library, Acquisitions Unit
National Institutes of Health
Building 10
Bethesda, Maryland 20014

DATE DUE

GAYLORD
PRINTED IN U.S.A.

LIBR
NIH
Amazing
Amazing
http://nihlibrary.nih.

10 Center Drive
Bethesda, MD 20892-1150
301-496-1080

NIH LIBRARY
4 0129 0188

NIH LIBRARY
3 1496 00182 8352